



**IF YOU DON'T KNOW WHERE YOU ARE
GOING, YOU PROBABLY WILL END UP
SOMEWHERE ELSE. COMPUTER
NETWORK OPERATIONS FORCE
PRESENTATION**

GRADUATE RESEARCH PROJECT

M. Bodine Birdwell, Major, USAF

AFIT/ICW/ENG/09-02

**DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY**

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

The views expressed in this graduate research project are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the United States Government.

**IF YOU DON'T KNOW WHERE YOU ARE GOING,
YOU PROBABLY WILL END UP SOMEWHERE ELSE. COMPUTER NETWORK
OPERATIONS FORCE PRESENTATION**

GRADUATE RESEARCH PROJECT

Presented to the Faculty

Department of Electrical & Computer Engineering

Graduate School of Engineering and Management

Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the

Degree of Master of Cyber Warfare

M. Bodine Birdwell, BS, MA

Major, USAF

AFIT/ICW/ENG/09-02

June 2009

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

**IF YOU DON'T KNOW WHERE YOU ARE GOING,
YOU PROBABLY WILL END UP SOMEWHERE ELSE. COMPUTER NETWORK
OPERATIONS FORCE PRESENTATION**

M. Bodine Birdwell, BS, MA

Major, USAF

Approved:



Robert F. Mills, PhD (Chairman)

29 MAY 09

date



Lt Col Jeffrey T. McDonald, USAF (Member)

29 MAY 09

date



Richard A. Raines, PhD (Member)

29 May 09

date

Abstract

The purpose of this research was to determine if computer network operations force presentation determination could benefit from studying examples from how existing functional combatant commands present forces and capabilities to the geographic combatant commands. Specifically, this study researched how the US Strategic Command integrates space capabilities, how US Transportation Command presents logistics capabilities and how US Special Operations Command presents special operations forces. The research objective was achieved by a literature review analyzing joint doctrine. Key topics examined during the literature review include the interrelationships between functional combatant commands and geographic combatant commands, command and control of cross-domain dependencies, and management of Title 10 relationships.

This literature review of joint doctrine indicates USSTRATCOM should consider implementing the following three actions in order to mature CNO force presentation and C2 into an organic force within each GCC. USSTRATCOM should:

- (a) Adapt the space SCA and proponent concepts.
- (b) Use the logistics force presentation model as an intermediary step towards organic force presentation.
- (c) Endorse a strategy of organic CNO force presentation within each GCC.

Acknowledgments

I must first thank my personal Savior Jesus Christ for carrying me every single day. I must also thank my wife and children for supporting me these last thirteen years. I also must thank my friend and mentor, Dr. Robert Mills, for guiding a history major with little understanding of computers through a year long process to gain a broad understanding of the challenges of warfare in the cyber domain. I also must thank Mr. Charlie Youther, the Associate Dean of the Air Force Institute of Technology's School of Systems and Logistics for mentoring me over the course of the year and reviewing my research.

Table of Contents

Abstract	iv
Acknowledgments.....	v
List of Figures	vii
If You Don't Know Where You Are Going, You Probably Will End Up Somewhere Else. Computer Network Operations Force Presentation.	1
I: Introduction	1
Background	1
Motivation.....	2
Purpose.....	5
Scope and Limitations.....	7
Results.....	8
Thesis Methodology.....	8
II: How Do Functional Combatant Commands interrelate with Geographic Combatant Commands?	9
Who "Owns" The Forces?	9
How Does The FCC Communicate With The GCC?	13
How Does The GCC Communicate With The FCC?	19
Lessons Learned.....	24
III: How Do Combatant Commands Manage Cross-Domain Dependencies?.....	28
What Is The End User's Perspective?.....	28
How Can Cross-Domain Planning Occur?	30
How Do These Functions Communicate Between Domains?	31
Lessons Learned.....	35
IV: How Do COCOMs Manage Title 10 Relationships?.....	38
Relationship Between Independent Operations	38
Relationships Between Interdependent Operations	42
Relationships within Organic Operations	47
Lessons Learned.....	49
V: A Roadmap to Distributed CNO Capability	52
Independent Actions: USSTRATCOM provides CNO.....	52
Interdependent Actions: USSTRATCOM Works With GCC to Provide CNO.....	54
Organic Actions: USSTRATCOM Works With Theater CNO Commands	55
VI: Conclusions and Recommendations for Further Research	57
Bibliography	58
Vita.....	60
Endnotes.....	61

List of Figures

Figure 1: Joint Doctrine Hierarchy	4
Figure 2: Notional IO Cell	4
Figure 3: Command Relations	10
Figure 4: Categories of Support	11
Figure 5: JFCC Space Concept	14
Figure 6: DDOC Concept	18
Figure 7: C-130 and AC-130 Gunship	19
Figure 8: Space Coordinating Authority	21
Figure 9: DDOC Communicates with JDDOC	22
Figure 10: Theater Special Operations Component	23
Figure 11: Organic Force Presentation Model	23
Figure 12: Force Presentation Templates	24
Figure 13: Unified Command Plan	26
Figure 14: Space Cross Domain Communications	32
Figure 15: Logistics Cross Domain Communications	32
Figure 16: Notional Special Operations Liaison Element Functions	34
Figure 17: Integration Requirements	37
Figure 18: USSTRATCOM Space Proponents	42
Figure 19: Joint Logistics Education	45
Figure 20: JSOTF Composition	48
Figure 21: Notional JTF with CNO	51
Figure 22: Theater CNO Command/Joint CNO Component	51
Figure 23: CNO Presentation Model	56

If You Don't Know Where You Are Going, You Probably Will End Up Somewhere Else.^a
Computer Network Operations Force Presentation.

I: Introduction

Background

The US military defines joint doctrine as fundamental principles that guide the employment of US military forces in coordinated action toward a common objective.¹ At its most basic level, joint doctrine is the glue enabling US armed forces from different Services to jointly conduct military operations. It embodies the common vocabulary ensuring what is stated also is unambiguously conveyed.

The Chairman of the Joint Chiefs of Staff instruction on developing joint doctrine states:

*Joint doctrine is based on extant capabilities, i.e., current force structures and materiel. It incorporates time-tested principles; e.g., the principles of war, operational art, and elements of operational design for successful military action, as well as contemporary lessons that exploit US advantages against adversary vulnerabilities.*²

It is difficult to develop doctrine for cyberspace, something the Department of Defense (DoD) is still endeavoring to fully understand. General Kevin P. Chilton, the commander of US Strategic Command (USSTRATCOM), hosted a Cyberspace Symposium in April of 2009. He unequivocally stated in his opening remarks, "I'll tell you what, we know we don't have all the answers, and often times don't even know what the right questions are to ask."³ This reality makes developing joint doctrine difficult but also even more urgent because the DoD is a hierarchical organization with many moving parts that depends on doctrine to define the lines in the road for when different organizations interact.

^a The first half of this paper's title is a statement made by Laurence J Peter, 1919-90, Canadian academic and expert on organized hierarchies, from his 1969 book "*The Peter Principle*". The quote is available online at <http://www.brainyquote.com/quotes/quotes/l/laurencej126281.html> and was accessed on 16 May, 2009.

Lieutenant General Keith B. Alexander, the Director of the National Security Agency and Commander of USSTRATCOM's Joint Functional Component Command for Network Warfare also addressed this fundamental challenge facing cyberspace warfighting capabilities when he stated in a 2007 *Joint Force Quarterly* article entitled, "Warfighting in Cyberspace" that although the US has a national strategy for cyberspace operations, it has not yet translated into operational doctrine.

Despite this emphasis, however, we can argue that, while we have ample national level strategies, we have yet to translate these strategies into operational art through development of joint doctrine for cyberspace. Through the doctrine vetting process, we can develop a common understanding of what it means to conduct warfare within and through cyberspace.⁴

Motivation

There are 77 currently approved joint doctrine publications; cyber issues are discussed primarily in two publications. The traditional view of maintaining and operating a network are captured in the concept of network operations (NETOPS). Joint Publication (JP) 6-0, *Joint Communications System*, defines NETOPS as "activities conducted to operate and defend the Global Information Grid^b."⁵ Doctrine elaborates, "NETOPS provides assured network enabled services in support of DOD's full spectrum of warfighting, intelligence, and business missions throughout the global information grid."⁶ NETOPS defense activities are more heavily focused on hardening the network than actively defending against an attack. For the purpose of this research effort, the author will distinguish computer network defense activities from computer network maintenance and daily operations activities because joint doctrine clearly delineates the roles and responsibilities of building, maintaining and operating a network in JP 6-0.

^b JP 6-0 defines the GIG as "the globally interconnected, end-to-end set of information capabilities, associated processes and personnel for acquiring, processing, storing, transporting, controlling, and presenting information on demand to joint forces and support personnel." (JP 6-0, p. II-1)

Computer network operations (CNO) are discussed from the operational perspective in JP 3-13, *Information Operations* (IO); however, joint doctrine inadequately addresses force presentation issues and command & control (C2) for CNO, which are divided into: computer network attack (CNA)^c, computer network defense (CND)^d and computer network exploitation (CNE)^e. As evidence of this, Figure 1 shows CNO is the only IO sub-discipline without its own joint doctrine publication. Currently JP 3-13 implies all CNO activities in the joint task force are orchestrated by two or three members of the IO cell. Figure 2 shows a USSTRATCOM representative responsible for CNO and the J-6 representative responsible for Information Assurance and CND. Although doctrinal, this research argues that this is not the best methodology to present CNA/CND/CNE (or simply stated, CNO) forces because it places the burden for command & control (C2) of all CNO forces on two members within the IO Cell.

Lieutenant General Alexander hinted at the lack of suitability of presenting CNO via the IO Cell when he stated in the “Warfighting in Cyberspace” article that limiting the concept of cyberwarfare within the arena of IO was itself an unsound doctrinal concept.

Although it is understood that land, maritime, air, and space warfare will be employed to deter (for example, influence) an adversary, no one believes that warfare within these domains is uniquely “information operations.” Where the principal effect of IO is to influence an adversary *not* to take an action, the principal effect of cyber warfare is to deny the enemy freedom of action in cyberspace.⁷

^c **CNA** consists of actions taken through the use of computer networks to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves. (JP 3-13, p. II-5)

^d **CND** involves actions taken through the use of computer networks to protect, monitor, analyze, detect, and respond to unauthorized activity within DOD information systems and computer networks. CND actions not only protect DOD systems from an external adversary but also from exploitation from within, and are now a necessary function in all military operations. (JP 3-13, p. II-5)

^e **CNE** is enabling operations and intelligence collection capabilities conducted through the use of computer networks to gather data from target or adversary automated information systems or networks. (JP 3-13, p. II-5)

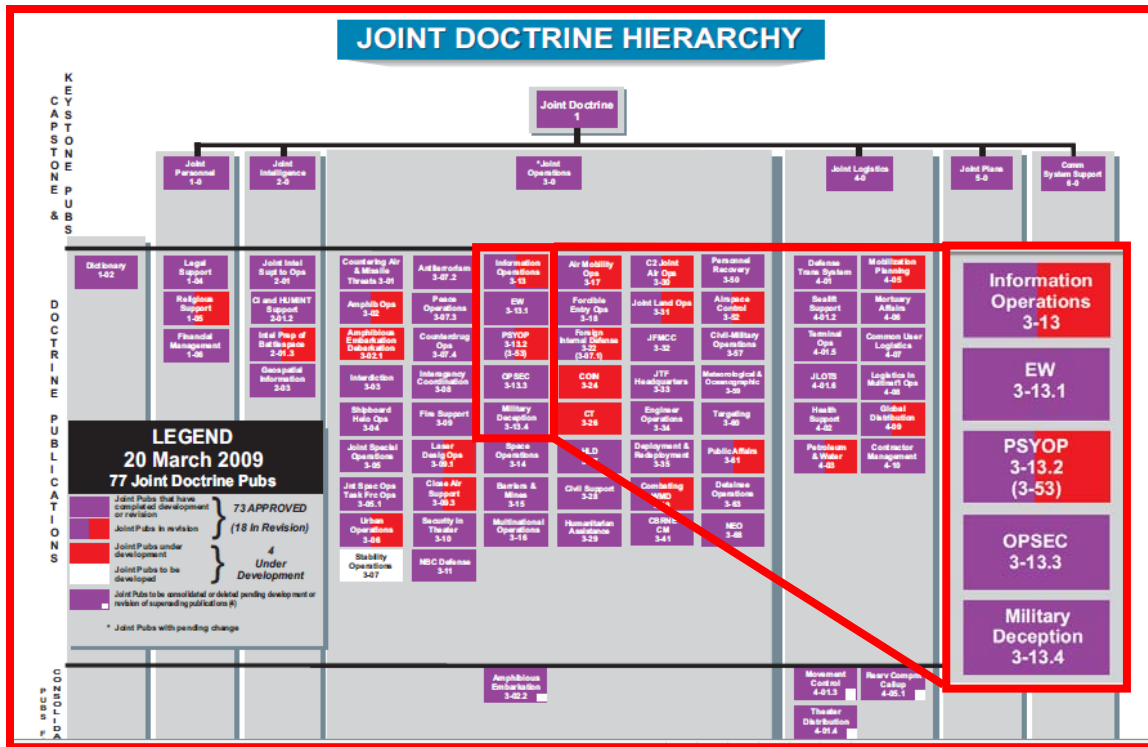


Figure 1: Joint Doctrine Hierarchy⁸

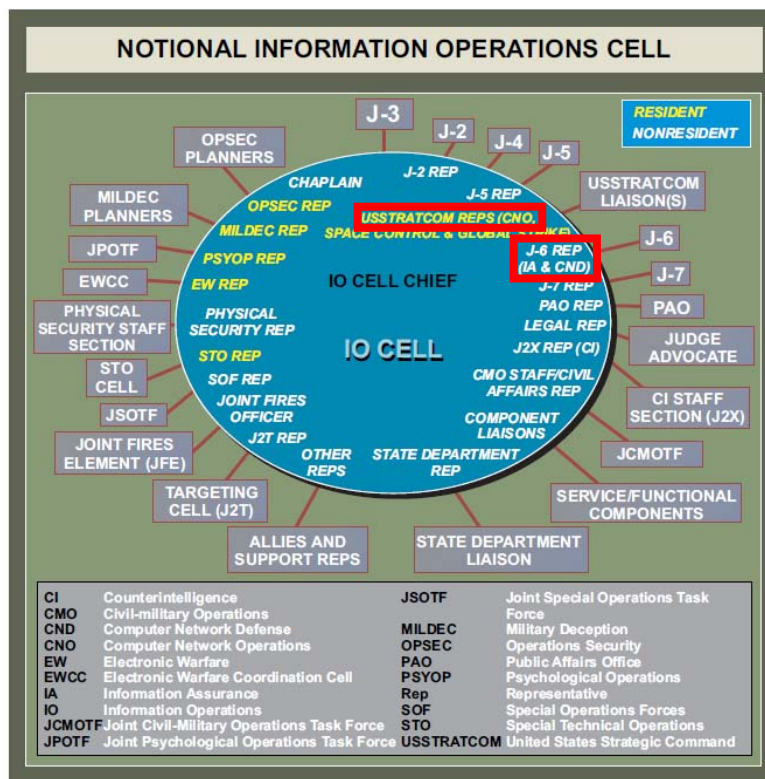


Figure 2: Notional IO Cell⁹

Lieutenant Colonel Sebastian M. Convertino II, Lou Anne DeMattei, and Lieutenant Colonel Tammy M. Knierim wrote their Air Warfare College Thesis in 2007 entitled *Flying and Fighting in Cyberspace*. In it, the authors discussed the importance of separating the information flowing through the domain from the domain itself. They use the concept that strategy equals the ends plus the ways plus the means to make this point.

Current IO doctrine and operating concepts blur the distinction between physical and nonphysical aspects of the “domain,” fail to distinguish between “content” and “noncontent” actions on data and information, and combine what are essentially both methods and effects under the rubric of “capabilities.” Consequently, current doctrine is limited in its ability to provide a clear and delimited organizing construct for development of synchronized application (ways) of cyber capabilities (means) to achieve desired effects in both cyberspace and other domains (ends). Nonaligned effects require functionally diverse capabilities. They complicate the development of cyber capabilities as well as cyber-related organizational management.¹⁰

As USSTRATCOM discusses standing -up a sub unified command for cyberspace^f operations, now is the time to be asking, what is the best force presentation and C2 model? How can the DoD transform to produce the best model?

Purpose

Richard Heuer, a former Central Intelligence Agency senior analyst, discussed several methodologies by which an analyst could test a hypothesis in his book *Psychology of Intelligence Analysis*. In it, he discussed two opposing templates for looking at a problem; either the problem is unique or it isn't. If it isn't, then it can benefit from studying similar problems to determine relevant lessons learned.¹¹ He warned that intelligence analysts who are experts in a specific

^f JP 1 defines cyberspace as “a global domain within the information environment consisting of the interdependent network of information technology infrastructures, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers” (JP 1, p. I-7)

The Wall Street Journal published an article on 24 April, 2009, discussing the new Cyber Command; the article is available online for viewing at <http://online.wsj.com/article/SB124060266381953839.html>.

subject will be inclined to use the “it is unique” or situational model and miss valuable lessons learned from using the “it isn’t unique” or a theory approach. There are no doubt some aspects of cyberspace that make it unique; however, Mr. Heuer’s admonition to intelligence analysts hints there are also relevant lessons learned applicable to CNO force presentation and C2 that can be determined from studying how functional combatant commands (FCCs)^g currently interact with geographic combatant commands (GCCs)^h. The global, interdependent, and distinctive nature of cyberspace lends itself to comparison with how three FCCs currently interact with GCCs.

The manner in which FCCs and GCCs interact is similar to how individuals interact, albeit on a much larger scale. For example, when a group of students must work together to complete a class assignment they have several interactions to choose from. The simplest methodology would be to break the assignment up into individual parts and complete the assignment independently. Although simple to implement, independent action minimizes the advantages of group interactions. Another interaction model the students could use would be to complete the assignment interdependently. Working together would make interactions more complex, but would maximize participation and provide the most vetted answer possible. An alternative model the group could use would be to create a hierarchical structure and develop roles and responsibilities for each member. Although more complex, it provides accountability and creates a chain of command for internal conflict resolution.

This research will specifically study three FCCs through the lens of joint doctrine:
USSTRATCOM via space operations; US Transportation Command (USTRANSCOM) via

^g FCCs are responsible for a large functional area requiring single responsibility for effective coordination of the operations therein. These responsibilities are normally global in nature. (JOINT PUBLICATION1, I-14)

^h GCCs are responsible for a large geographical area requiring single responsibility for effective coordination of the operations within that area. (JOINT PUBLICATION1, I-14)

logistics; and US Special Operations Command (USSOCOM) via special operations. All tackle issues which are extremely relevant to CNO: global nature, complex interdependencies and specialized capabilities. Like the hypothetical class assignment, each FCC's deals with force presentation and C2 using one of the three notional class examples in order to complete its mission. Furthermore, the manner in which the three FCCs present and C2 forces presents a building-block methodology as CNO develops from its infancy to a mature end state. This research argues the DoD should adopt a roadmap using space immediately, but address logistics interactions as a midterm template, enroute to the goal of modeling CNO force presentation and C2 on special operations.

Scope and Limitations

This research will limit its scope to a literature review of joint doctrine. As stated in the beginning of this chapter, the US military defines joint doctrine as fundamental principles that guide the employment of US military forces in coordinated action toward a common objective.¹² Joint doctrine captures the best practices from history and recent conflicts and presents an effective methodology to both present and C2 forces. This research did not endeavor to interview subject matter experts or cite non-doctrinal anecdotal historical examples because the use of doctrine made those actions unnecessary. Furthermore, as Lieutenant General Alexander pointed out, the DoD is currently lacking in regards to joint doctrine for CNO. For that reason, this research looked to similar situations to develop relevant lessons learned.

This research chose to separate the “*operate the network*” from the “*defend the network*” portions of NETOPS specifically to address C2 and force presentation for fighting in the domain rather than maintaining the domain. Although, the two are closely related, they are not necessarily the same. As previously stated, JP 6 currently addresses actions required to build and

maintain the cyberspace domain but does not adequately address actions for fighting and contesting the domain.

Results

This literature review of joint doctrine indicates US Strategic Command should consider adopting specific lessons learned from the force presentation and C2 for space, logistics and special operations. Adoption of these lessons learned should make CNO force presentation and C2 more capable, efficient, and integrated within the DoD warfighting construct.

Thesis Methodology

When determining how to fight in a new domain, two issues are of importance for interoperability with components from other domains: (1) how is force presentation occurring? and (2) how will C2 operations work? This research will look at lessons learned through a study of joint doctrine regarding the above three combatant commands through the filter of three questions:

- 1) How do Functional Combatant Commands interrelate with Geographic Combatant Commands?
- 2) How do Combatant Commands C2 cross-domain dependencies?
- 3) How do Combatant Commands manage Title 10 relationships?

Chapter II will address the first question, chapter III will address the second question and Chapter IV will address the third question. Chapter V provides a roadmap for implementation and Chapter VI will draw conclusions and provides ideas for further research.

II: How Do Functional Combatant Commands interrelate with Geographic Combatant Commands?

General Chilton outlined USSTRATCOM's role in regards to cyberspace in his opening remarks at the USSTRATCOM 2009 Cyberspace Symposium:

To direct the operations every day of the Global Information Grid that supports our combatant commands and services all around the world every day, to operate it, to defend it, both in peacetime and at war; to be prepared to plan and when directed conduct offensive operations through this medium for this domain; to synchronize operations between combatant commanders in the regions and across the globe; and to be the principal advocate for the capabilities and needs for the warfighters in this domain.¹³

General Chilton's comments reveal the DoD is currently using a model requiring the FCC to work with the GCC to present CNO capability. Therefore, this research argues that it is useful to understand how other FCCs interrelate with GCCs in order to determine relevant lessons learned.

Answering the question of how FCCs interrelate with GCCs requires addressing three interrelated questions, which are

- (1) Who "owns" the forces?
- (2) How does the FCC communicate to the GCC?
- (3) How does the GCC communicate to the FCC?

Who "Owns" The Forces?

By "owns" this research means who maintains combatant command (COCOM) authority over the forces. Joint doctrine reveals that, in regards to people, often the commander directing forces (predominantly a GCC) does not actually "own" them, but rather uses one of two distinct options.

The first option for the combatant commander (CCDR) requesting forces (most likely from a GCC) is to request another combatant command, most likely the US Joint Forces

Command (USJFCOM), to pass forces and operational control (OPCON) of the forces to the requesting commander.¹⁴ When a commander passes control of forces, either OPCON or tactical control (TACON), to another commander, the gaining commander directs the forces in their actions. Figure 3 explains relationship between the three levels of command.



Figure 3: Command Relations¹⁵

The second option is for an authority above both organizations within the chain of command to create a support relationship between the two organizations. Of significance, only the Secretary of Defense (SECDEF) can determine support relationships between CCDRs.¹⁶ Support enables distinct organizations, from COCOMs to small units, to determine planning and execution priorities based upon the level of support directed. Unlike in command relationships such as TACON and OPCON, command of forces is not passed; rather, the supported commander can direct the supporting commander to accomplish actions. The four support categories define levels of support that range from general to close, as shown in Figure 4.

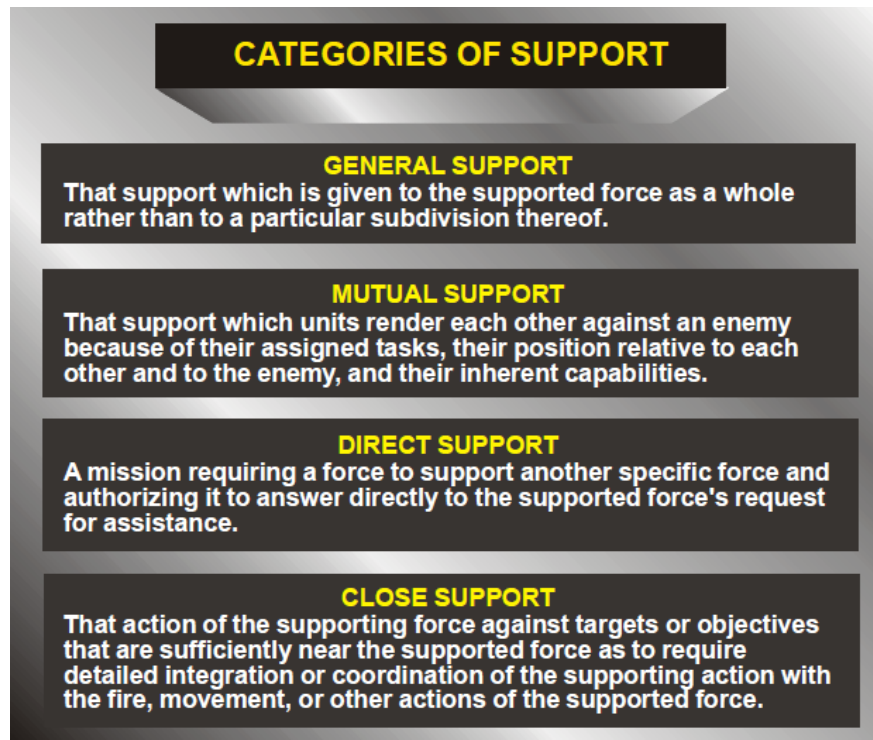


Figure 4: Categories of Support¹⁷

Up to this point, the forces presented have been people. However, “ownership” of an asset or capability can be very relevant as well.

Space capability “ownership” offers another method to present forces. The global nature of the space domain makes geographic apportionment difficult, if not often impossible.¹⁸ For this reason, space capability “ownership” (such as OPCON or TACON) is not passed from the asset owner, USSTRATCOM, to other combatant commands. Rather, USSTRATCOM uses the support construct to meet other COCOM space support requirements.¹⁹

Space doctrine emphasizes, “Space forces simultaneously support multiple users. This requires extensive coordination, planning, and the early integration of requirements and capabilities.”²⁰

USSTRATCOM could be the supporting commander for several GCCs simultaneously because it owns all of the space forces. Hence, USSTRATCOM must work to balance all the

supported CCDRs' requirements using a limited number of platforms. There may not be enough assets to support everyone; someone may not get the support desired.

Another example of "ownership" is in the shared ownership of air mobility assets. Doctrinally, air mobility force "ownership" can be segmented into three distinct classifications: those forces under the COCOM of USTRANSCOM; those forces under the COCOM of the GCC, such as US Pacific Command (USPACOM); and each Service's organic air mobility forces.²¹ For example, assume that Army forces in the Republic of Korea require additional Kevlar vests. USTRANSCOM can *support* USPACOM activities by flying a C-17 *Globemaster* carrying pallets of Kevlar vests from the Continental United States (CONUS) to Yokota Air Base, Japan. There two USPACOM C-130 *Hercules* (over which the GCC maintains COCOM authority) could fly the pallets to Osan Air Base where a US Army C-23 *Sherpa* (organic mobility force) could make several trips to fly the pallets to Camp Red Cloud. Using the best available means of transportation, USTRANSCOM supports the GCCs and also aids the GCC in determining the best organic capability (theater or Service) to meet GCC logistical support requirements.

Finally, consider the ownership of special operations forces. USSOCOM is unique when discussing force presentation because all special operations forces stationed in the CONUS fall under the COCOM of USSOCOM rather than USJFCOM. Furthermore, USSOCOM is unique in that it is a FCC with service-like responsibilities. Last, special operations forces assigned to a GCC are under the COCOM of the GCC CCDR (not USSOCOM).²²

USSOCOM can provide special operations forces on a temporary basis to GCCs for operational employment. When transferred, the forces are attached to the gaining GCC with the GCC CCDR normally exercising OPCON over them.²³ In effect, USSOCOM maintains a

USJFCOM-like (rather than USSTRATCOM JFCC Space or USTRANSCOM) relationship with the GCCs.

USSOCOM is also unique in that it is an FCC which could also be the supported commander. The USSOCOM mission statement states:

Provide fully capable Special Operations Forces to defend the United States and its interests. Plan and synchronize operations against terrorist networks.²⁴

The rationale is that instances could arise where a regional (or GCC) mindset, rather than global, could be an impediment when fighting a “global war on terror.” Of note, because these operations act at the combatant command-to-combatant command exchange level, doctrinally the initiator of action is either the SECDEF or President of the United States.

There is no single force presentation silver bullet. However, the above methodologies provide mindsets which will be employed at the end of this chapter when capturing lessons learned.

How Does The FCC Communicate With The GCC?

The second question addresses the methodology by which the FCC (who provides either personnel or a capability) communicates with the requesting GCC.

USSTRATCOM has developed a doctrinal methodology to communicate with other COCOMs such that it maximizes the capabilities of its space resources to support the warfighter.

JP 3-14, *Space Operations*, states:

The Commander of USSTRATCOM advocates, plans, and executes military space operations and has the responsibility to prioritize, deconflict, integrate, and synchronize military space operations for current and planned joint operations. However, Commander, USSTRATCOM has designated the commander,

Joint Functional Component Command for Space (JFCC Space)ⁱ to manage day-to-day space operations. The Commander, JFCC Space is the focal point for military space operations, and maintains coordinating authority for planning and execution of space operations by designated space forces. The Commander, USSTRATCOM has delegated OPCON of designated space forces to the Commander, JFCC Space, in order for JFCC Space to accomplish its mission.²⁵

USSTRATCOM's model centralizes space support issues within JFCC Space such that JFCC Space becomes the USSTRATCOM space "help desk" for warfighter support. Therefore, the space model centralizes FCC-GCC communications through a specified channel, JFCC Space, as shown in Figure 5.

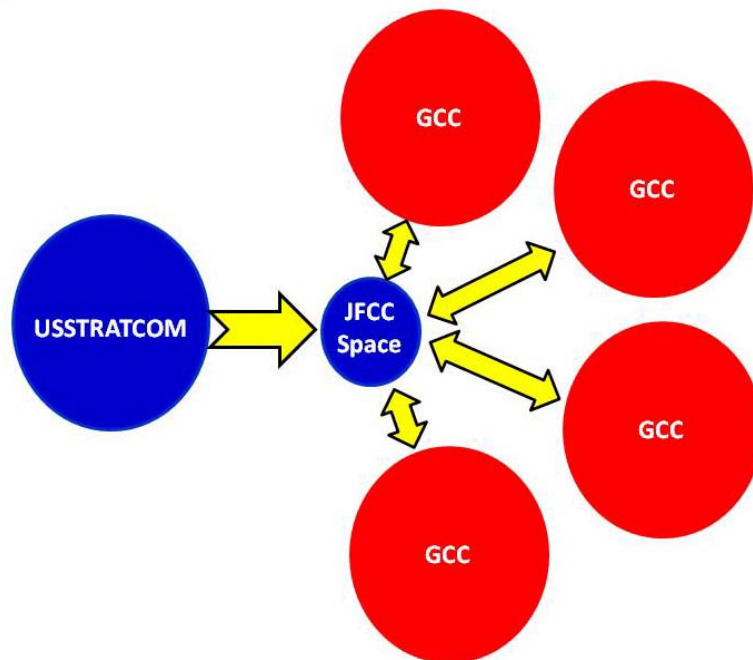


Figure 5: JFCC Space Concept

JFCC Space must communicate with all combatant commands and maintain situational awareness on how space operations integrate with all the other combatant command's activities.

ⁱ The USSTRATCOM website (http://www.stratcom.mil/functional_components/) states the mission of JFCC Space as "Continuously coordinates, plans, integrates, commands and controls space operations to provide tailored, responsive, local and global effects, and on order, denies the enemy the same, in support of national, USSTRATCOM, and combatant commander objectives."

In order to communicate effectively, JFCC Space utilizes an air operations center construct to effectively C2 military space operations. JFCC Space created the Joint Space Operations Center (JSPOC) to meet this requirement.

The mission of the JSPOC is to provide the Commander, JFCC Space with agile and responsive C2 capabilities to conduct space operations on a 24/7 basis. The JSPOC is built around an air and space operations center adapted specifically for space missions and global operations.²⁶

JFCC Space adapted the air tasking order concept to create the joint space tasking order to provide other combatant commands visibility into the allocation of space resources.²⁷ The visibility presented in the joint space tasking order brings with it an implied transparency in the methodology of presenting space forces. It documents JFCC Space (and in effect, USSTRATCOM's) actions endeavoring to meet as many combatant commands' space requirements as possible.

The joint space tasking order is not an exhaustive list of space missions because it does not account for missions by non-DOD space assets or those limited space forces assigned to a GCC, thereby creating potential conflicts between DOD and non-DOD agencies. Space doctrine states that communication with external agencies may be required to deconflict space operations.²⁸ This caveat would also likely be relevant in any discussion of CNO tasking order development.

C2 for daily operations is but one facet of JFCC Space's communication with other combatant commands. JFCC Space must also integrate space capabilities within other combatant command's operational or concept plans (OPLANs or CONPLANs) by developing supporting plans.²⁹ The development of supporting plans provides JFCC Space the opportunity to clearly define support relationships and adjudicate disagreements prior to operation execution.

Space doctrine states the Commander, USSTRATCOM (not the Commander, JFCC Space) will, “prioritize space capabilities and make apportionment and allocation recommendations for DoD systems in coordination with supported commanders. SECDEF will determine solutions for the supported commander’s needs that cannot be fulfilled by the supporting commander.”³⁰ Requesting SECDEF arbitration is not an ideal doctrinal template.

Joint Space doctrine continues the discussion by clarifying that all shortfalls or other limitations are forwarded to the Chairman of the Joint Chiefs of Staff first for coordination, resolution, adjudication, and apportionment.³¹ Following Chairman or SECDEF arbitration, review and approval of the space supporting plan is the responsibility of the supported commander (often, the GCC).³² The supported commander must approve of the space supporting plan in its entirety prior to the plan being completed. This level of control over the supporting plan enables the supported commander to know that space support for the CDR’s OPLAN or CONPLAN has been leveraged to the maximum extent possible.^j

From the perspective of USSTRATCOM, its actions occur independently of any actions taken in the theater; USSTRATCOM is not dependent upon the GCC to accomplish some task for USSTRATCOM to accomplish its task in space. However, the space relationship is inherently a dependent one from the perspective of the GCC.

This point becomes relevant when contrasting the relationship with that of USTRANSCOM. Whereas the relationship between USSTRATCOM and the GCCs (in regards to space) can be described as one of support relationships, the relationship between USTRANSCOM and other combatant commands can best be described as an interdependent relationship.

^j The arbitration required between two CDRs elevates to the SECDEF-level. Following this model, one can see the challenges within interagency activities (as likely required for CNO). Arbitration would rest at the Presidential level...an obviously undesirable situation.

Take for example how USTRANSCOM works with GCCs regarding transportation feasibility. Joint Publication 4-0, *Joint Logistics*, states, “USTRANSCOM supports GCCs with coordinated transportation planning expertise required during the contingency planning process.”³³ USTRANSCOM does not develop a support plan to codify the support relationship; rather, USTRANSCOM logisticians will work with the combatant command staff to produce the time-phased sequencing of forces, which is the basis for transportation feasibility assessments.³⁴

Although the process is integrated, there still exists something of the support plan methodology utilized by space. For example, USTRANSCOM and other transportation providers develop transportation schedules for movement requirements identified by the supported commander.³⁵ A transportation schedule is similar to a joint space tasking order in that both provide the supported commander visibility into how the FCC will support the supported GCC’s activities. However, the transportation schedule is not a tasking order and does not necessarily mean that the supported commander’s concept of operations is transportation feasible; rather, the schedules provide the most effective and realistic use of available transportation resources in relation to the phased concept of operations.³⁶ Feasibility will be determined via the time-phased sequencing of forces. The important point is that although USTRANSCOM works with several partners to ensure the supported combatant command’s transportation requirements are met, the partners operate independently, interdependently and dependently.

USTRANSCOM must communicate directly with each GCC. It does so through its Deployment and Distribution Operations Center (DDOC).³⁷ The DDOC works with the GCC to ensure the warfighter receives support via independent yet interdependent and dependent transportation activities. In effect all three types of communication must occur in order for the

warfighter to receive the proverbial beans, bullets and people. Figure 6 endeavors to capture the concept of the DDOC.

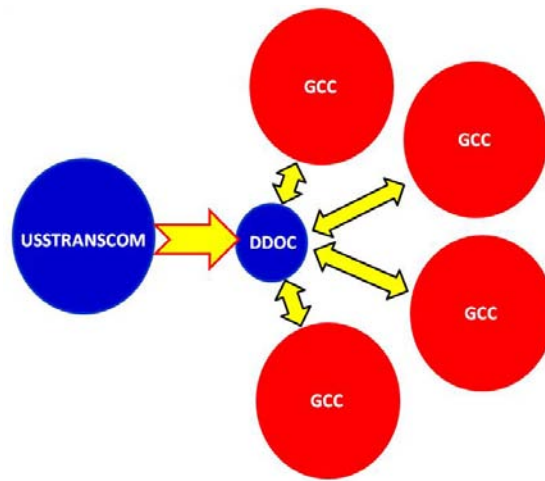


Figure 6: DDOC Concept

USSTRATCOM and USTRANSCOM both communicate to GCCs from the perspective of an FCC; but USSOCOM also communicates in a manner like a Service.³⁸ The Service-like communications are worthy of discussion in that USSOCOM maintains responsibility to organize, train, and equip theater special operations forces regarding special operations-specific areas. USSOCOM addresses theater special operations-specific individual education and training requirements as well as special operations-specific system requirements. These Service-like responsibilities combine with theater integration to create an organic communication channel.

From the Service-like perspective, USSOCOM maintains the Joint Special Operations University school system to provide continuing education for world-wide special operations forces. The university focuses on educating senior and intermediate special operations leaders and selected non-special operations decision makers, both military and civilian, in joint special

operations.³⁹ This emphasis on continuing education is an important aspect of developing any professional force.^k

USSOCOM also maintains a Service-like communication channel with the GCC with the intent of ensuring the GCC's special operations forces have the proper equipment to conduct warfare within the GCC. USSOCOM maintains its own major force program (MFP) to specialize Service-procured equipment. For example, the US Air Force will procure a C-130 *Hercules* and deliver it to Air Force Special Operations Command. Air Force Special Operations Command will use the special operations MFP to then “upgrade” the C-130 into a special operations AC-130U *Spooky* gunship. Figure 7 shows both a C-130 and AC-130.

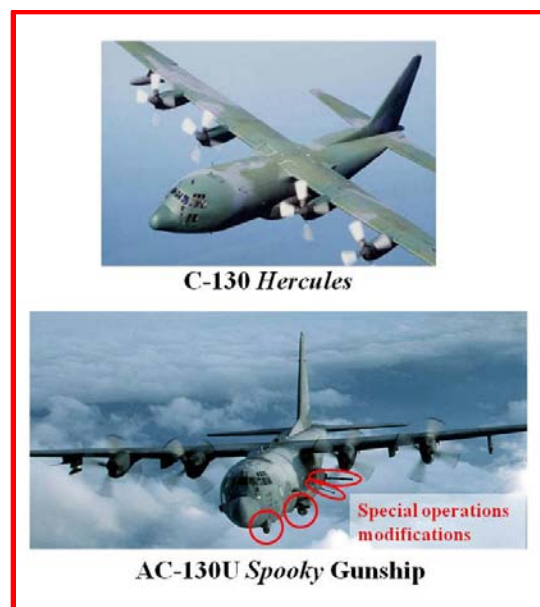


Figure 7: C-130 and AC-130 Gunship⁴⁰

How Does The GCC Communicate With The FCC?

Any communication must be two-way in nature; this research will now address communication from the perspective of the GCC. The previous section discussed how the Commander, USSTRATCOM, delegates certain day-to-day communication activities to the

^k This Service-like responsibility is mirrored in the Services role in developing Space and Logistics professionals.

Commander, JFCC Space. Likewise, JP 3-14, *Space Operations*, states, “[The GCC Commander m]ay designate a space coordinating authority (SCA) and delegate appropriate authorities for planning, integrating, and coordinating space operations within the operational area.”⁴¹ JP 3-14 recommends where to place the SCA:

A supported joint force commander normally designates an SCA to coordinate joint space operations and integrate space capabilities. Based on the complexity and scope of operations, the JFC can either retain SCA or designate a component commander as the SCA. The joint force commander considers the mission, nature, and duration of the operation; preponderance of space force capabilities made available; and resident C2 capabilities (including reachback) in selecting the appropriate option. The SCA is responsible for coordinating and integrating space capabilities in the operational area, and has primary responsibility for joint space operations planning, to include ascertaining space requirements within the joint force.⁴²

In many regards, the SCA serves as the CDR’s focal point for all space support operations. An SCA can work with JFCC Space for all types of space support issues. JP 3-14 caveats that an SCA speaks on behalf of the joint force commander (JFC), or CDR, but cannot make determinations on their behalf:

The SCA gathers operational requirements that may be satisfied by space capabilities and facilitates the use of established processes by joint force staffs to plan and conduct space operations. Following coordination, a prioritized list of recommended space requirements based on joint force objectives is provided to the JFC. Upon commander approval, the list is submitted to the combatant commander for coordination with the Commander, USSTRATCOM. To ensure prompt and timely support, the Commander, USSTRATCOM may approve direct liaison authorized as appropriate. This does not restrict combatant commander Service component commands from communicating requirements directly to their counterpart USSTRATCOM Service component commander. However, SCAs keep their respective commanders apprised of all such coordination activities to ensure that space activities are coordinated, deconflicted, integrated, and synchronized. SCAs at subordinate commands, if designated, will accomplish the same requirements for submission to the combatant command SCA as directed.⁴³

As a doctrinal model, SCA demonstrates the need to keep the chain of command informed whenever any type of give-and-take is required to ensure mission accomplishment.

Figure 8 illustrates this concept.

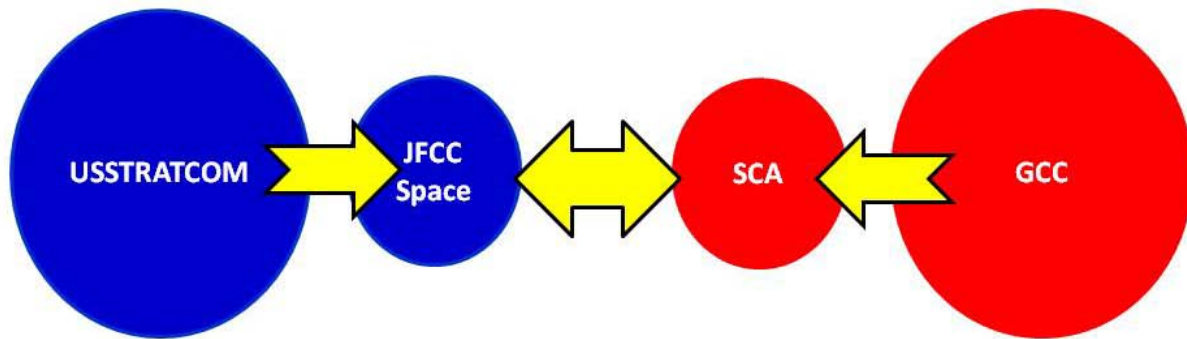


Figure 8: Space Coordinating Authority

The USSTRATCOM space force presentation model requires that the GCC explicitly and clearly state what space support it requires because USSTRATCOM completes its actions in space independent from the GCC. JP 3-14 states CCDRs are responsible to “specify offensive space control and defensive space control objectives to be met, and provide guidance for the employment of C2, communications systems, intelligence, logistics, and attack operations.”⁴⁴ This in no way implies an adversarial support system; rather, it is merely a “cost of doing business” brought about by the independent nature of the space operations. JP 3-14 continues, “GCC commanders may request the Commander of USSTRATCOM’s assistance in integrating space forces, capabilities, and considerations into each phase of campaign and major operation plans”⁴⁵ to demonstrate the willingness of USSTRATCOM to aid the GCC in maximizing space integration into GCC operations.

Similarly JP 4-0 also utilizes a doctrinal model that centers upon a single C2 node within the theater communicating directly with USTRANSCOM. Strategic deployment and distribution processes (managed via the USTRANSCOM DDOC) are linked with theater operational and

tactical functions, within the Joint Deployment Distribution Operations Center (JDDOC).⁴⁶ As stated earlier, USTRANSCOM communicates with the GCC independently, interdependently, and dependently. This action must be mirrored on the GCC side for the system to function. The GCC is dependent upon USTRANSCOM to get items into theater, but once in theater the GCC acts independently to transport items. Within the theater, the GCC develops a comprehensive transportation strategy which is interdependent with USTRANSCOM support but independent of USTRANSCOM direction. This relationship maintains the doctrinal concept that within the GCC, the CDR is in charge of operations.⁴⁷ Figure 9 illustrates this concept.

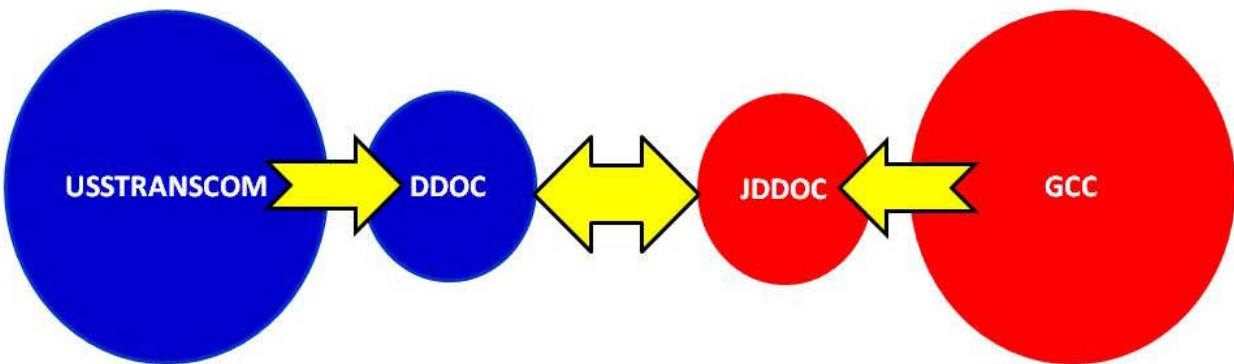


Figure 9: DDOC Communicates with JDDOC

Finally, JP 3-05 states how each GCC should both C2 and present special operations forces:

To provide the necessary unity of command, each geographic combatant commander (except for US Northern Command) has established a TSOC as a sub unified command within the geographic combatant command. The TSOC is the primary theater special operations forces organization capable of performing broad continuous missions uniquely suited to SOF capabilities. The TSOC is also the primary mechanism by which a geographic combatant commander exercises C2 over special operations forces.⁴⁸

Figure 10 illustrates the concept of the TSOC within the GCC construct.

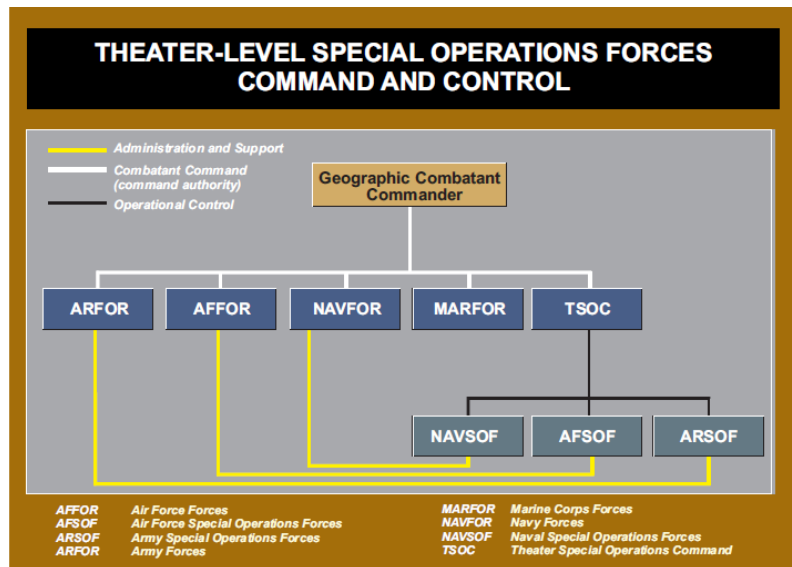


Figure 10: Theater Special Operations Component⁴⁹

Maintaining a sub unified command gives each GCC an organic special operations capability which can be augmented via USSOCOM. This template travels beyond interdependent communication to the level of organic communication. USSOCOM can operate as the supported commander within a GCC's area of responsibility, but this is the exception, not the rule.⁵⁰

Figure 11 attempts to capture the relationship between the GCC, TSOC and USSOCOM. The figure shows the GCC and USSOCOM interacting as an FCC and GCC. USSOCOM also maintains a USJFCOM-like relationship with the TSOC in that the TSOC augments its forces from USSOCOM. Last, the TSOC is completely organic to the GCC.

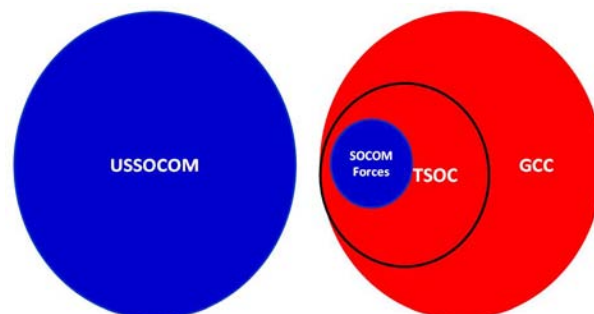


Figure 11: Organic Force Presentation Model

Lessons Learned

Figure 12 endeavors to capture the continuum of force presentation templates.

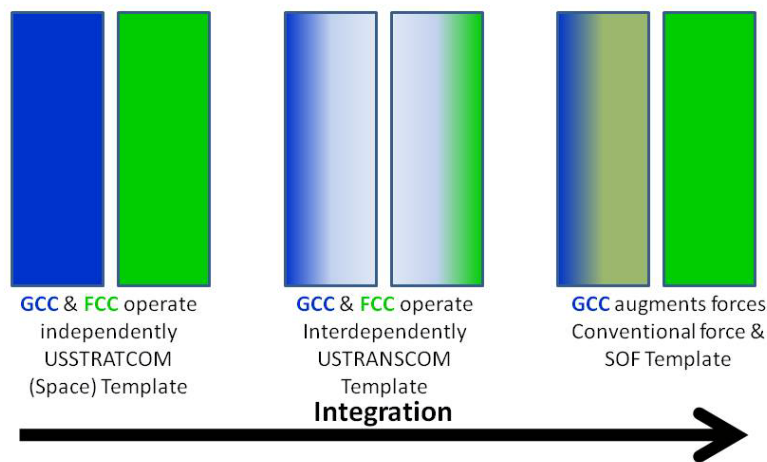


Figure 12: Force Presentation Templates

The two columns on the left of Figure 12 represent the USSTRATCOM (space) model. The two columns in the middle represent USTRANSCOM and the two on the right represent USSOCOM. It would be useful to identify where CNO currently lies along the spectrum before making any recommendations on CNO force presentation and C2.

General Chilton's quote at the beginning of this chapter reveals the DoD is currently using a model requiring the FCC to work with the GCC to present CNO capability. General Chilton provides further insight regarding CNO force presentation and C2 at the Air Force Association Global Warfare Symposium in November of 2008:

Let's move into the line of operation that we call cyberspace. Is that a support line for us? You bet. Just like space. Is it global in nature? You bet. Just like space. Do we operate in it every day? You bet. Just like space. In fact what we're tasked to do is to operate, defend, prepare to attack, and on order attack through this domain.⁵¹

Lessons learned from space force presentation and C2 such as the SCA can and should serve as a template for integrating CNO capabilities within the GCC in the present. The GCC

could utilize the SCA concept to capture specific CNO objectives for USSTRATCOM (or the new cyber subordinate unified command) to pursue. This methodology offers the benefit of being presently implementable because it is very similar to the current presentation methodology and maximizes usage of DoD CNO capabilities.

However, a review of joint doctrine indicates space presentation model should not be the desired end state. Some may question why a theater, vice global, perspective is a better force presentation model for CNO. The answer lies not in the cyberspace domain but rather in the Unified Command Plan and JP 1. The Unified Command Plan illustrates how the DoD postures its forces globally to conduct operations locally by dividing the world into geographic regions. Figure 13 shows the current Unified Command Plan.

The Unified Command Plan graphically depicts how the DoD is organized globally to conduct operations locally. JP 1 further demonstrates the DoD is organized globally to conduct operations locally. The first two assigned responsibilities listed under GCCs are to:

- (1) Deter attacks against the United States, its territories, possessions and bases, and employ appropriate force should deterrence fail;
- (2) Carry out assigned missions and tasks and plan for and executing military operations, as directed, in support of strategic guidance;⁵²

General Chilton in his remarks at the Air Force Association Global Warfighting Symposium hinted at the DoD focus on operating globally from a regional perspective when he said that COCOMs, GCCs in particular, plan for contingency operations.⁵³

Understanding how FCCs and GCCs interact leads to the determination that force presentation and C2 can fall within a range of methods. However, in and of itself, it does not provide a complete picture. Research presented in the next chapter into how COCOMs internally manage cross-domain dependencies will further refine the C2 and force presentation roadmap.

III: How Do Combatant Commands Manage Cross-Domain Dependencies?

We have the air domain, we have the land domain, we have the maritime domain, we have the space domain, and we have the cyberspace domain. – General Chilton, Commander, USSTRATCOM⁵⁵

JP 1 states:

The JFC can establish functional component commands to conduct operations. Functional component commands are appropriate when forces from two or more Military Departments must operate within the same mission area or geographic domain or there is a need to accomplish a distinct aspect of the assigned mission. Joint force land, air, maritime, and special operations component commanders are examples of functional components.⁵⁶

Because cyberspace is a warfighting domain in which forces from two or military departments operate, it is only a question of *when*, not *if*, there will be a need for a new functional component to conduct cyberspace operations. Using the template from Chapter II, this would ideally occur in the USSOCOM force presentation template because the DoD is postured globally to operate locally. This chapter will look to USSTRATCOM, USTRANSCOM, and USSOCOM for lessons learned on how these FCCs address cross-domain dependencies within their operations.

This research defines cross-domain dependencies as dependencies that cross two or more domains such as air, space, land, sea, and cyberspace. For example, a special operator behind enemy lines must be able to function without fear of being bombed by friendly air forces. This chapter will address three questions to provide insight for CNO C2. The three questions are

- (1) What is the end-user's perspective?
- (2) How can cross domain planning occur?
- (3) How do different functional components communicate?

What Is The End User's Perspective?

The perspective of the end user is not always directly discussed in joint doctrine. However, it can be inferred from various doctrinal statements. For example, cross-domain

communications are critical for the joint targeting process to be successful. JP 3-60, *Joint Targeting*, states that the second principle of targeting is that it should be effects based:

To contribute to the achievement of the JFC's objectives, targeting is concerned with the creation of specific desired effects through target engagement. Target analysis considers all possible means to create desired effects, drawing from all available capabilities. The art of targeting seeks to create desired effects with the least risk and expenditure of time and resources.⁵⁷

Joint targeting experts must remain domain-neutral when selecting methods to service targets. The previously discussed ends-ways-means methodology may help elaborate on this concept. For example, the JFC may desire an enemy C2 facility destroyed (the *ends*). The targeting experts could choose the air domain (the *ways*) by selecting a guided bomb unit (GBU)-31 dropped from an F-16 *Fighting Falcon*, (the *means*). Or perhaps the targeting experts could look to the land domain (the *ways*) and select an explosion orchestrated by a special operator on the ground (the *means*). Or perhaps the experts could choose the maritime domain (the *ways*) by selecting a Tomahawk cruise missile launched from a naval surface combatant (the *means*). The *ends* remained constant in all three examples while the *ways* and *means* changed implying the *ends* should not necessarily dictate the *ways* and *means*.

Likewise, the soldier receiving the resupply of ammunition does not care how the bullets got from the manufacturer to the frontline. The soldier is most interested that the bullets are available, not in the logistics actions taken by members of the GCC's JDDOC or USTRANCOM's DDOC. Logistics doctrine addresses this when it states:

Joint logistics spans the strategic, operational and tactical levels of war. It is, however, at the tactical level where the principal outcome—sustained logistic readiness—of joint logistics must be measured.⁵⁸

Furthermore, the pilot and weapon system officer flying an F-15E *Strike Eagle* do not care that USSTRATCOM is presenting the global positioning system (GPS) constellation via

JFCC Space to the GCC in which they are flying a combat sortie. Rather, they care that their inertial navigation system is receiving GPS updates.

The central point of the preceding examples is that the integration of the various domains at the operational-level of warfare must be seamless to the warfighter operating at the tactical level of warfare. Furthermore, if the actions required to integrate capabilities from one domain are more difficult to integrate from another domain then all else being equal, the user will choose the path of least resistance. Together the above two points provide the end user's perspective.

How Can Cross-Domain Planning Occur?

A study of joint doctrine for space operations, logistics, and special operations reveals a common thread regarding joint operational planning (JOP). One has to read doctrine carefully to find specific mention of how operational planning is conducted but the information is there. Planning references are not intentionally obscure; rather, all three documents expect the reader to read JP 5-0, *Joint Operation Planning*, which is the “joint template for military planning.”⁵⁹ This is significant because JOP is intentionally designed for the operational theater of war and is domain-neutral in its implementation.

For example, space doctrine discusses operational planning by stating how space capabilities can support or enable operational art in other domains. It then continues with a reference to JP 5-0 to utilize JOP.

Since operational art integrates ends, ways, and means across the levels of war, operational art and design should be considered when planning space operations at all levels. Space forces and capabilities can support or enable operational art and design... *For additional information on operational art and design, see Joint Publication 3-0, Joint Operations, and Joint Publication 5-0, Joint Operation Planning. (italics in original)*⁶⁰

JP 4-0 discusses activities within the JOP concept without mentioning joint operational planning specifically because it assumes all theater planning will occur within the JOP construct.

JP 4-0 therefore endeavors to incorporate logistics planning activities within the JOP model:

Using operational phases as the common denominator provides an effective method to ensure the support capabilities are provided when and where needed during the course of an operation.⁶¹

JP 3-05 also indirectly references using JP 5-0. However, it specifically references the importance of special operations forces integration within theater operational planning, which occurs using the JOP template.

Special operations integration into the GCC Planning Process. The TSOC is the primary link for integration of special operations forces into the GCC's planning process...The Commander, TSOC, provides input into GCC's OPLANs, the theater campaign plan, subordinate campaign plan, and theater security cooperation plan.⁶²

Ensure that the special operations forces requirements are entered in the Joint Operation Planning and Execution System.⁶³

Regardless of the domain of warfare, it is imperative to speak a common language in regard to cross-domain military planning. This is a fundamental requirement for effective joint operations. All theater components and supporting CCDRs must utilize a common planning template. Cross-domain activity integration at the operational level of war within a GCC depends upon planning process integration.

How Do These Functions Communicate Between Domains?

USSTRATCOM (space) works solely from the perspective of the domain of space, and as such can serve as a model for how a single domain functional component interacts with the GCC. The concept of the SCA serves as a cross-domain model for communicating between USSTRATCOM and the GCC. The SCA gathers the requirements from all Service and

functional components and on behalf of the GCC, speaks with one voice to the external agent, USSTRATCOM. In layman's terms, the SCA serves as the waiter at a restaurant who takes everyone's order and gives the consolidated request to the cook, JFCC-Space. Figure 14 endeavors to capture the GCC bodies the SCA represents when talking to JFCC Space.

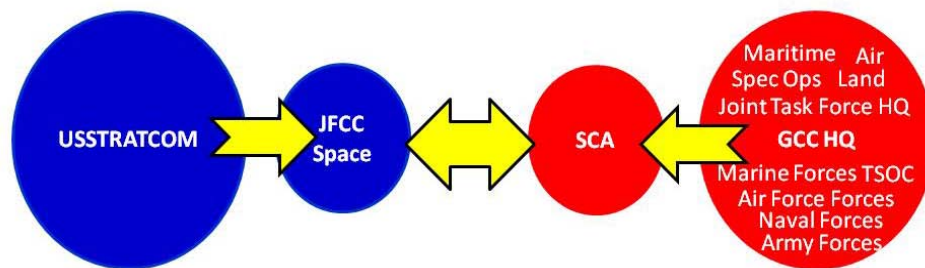


Figure 14: Space Cross Domain Communications

USTRANSCOM offers an alternative methodology because the functional component acts in multiple domains simultaneously using a single point of control. In USTRANSCOM, the single point of control is the DDOC. In the GCC, the single point of control is the JDDOC. In both USTRANSCOM and the GCC the single point of control manages transportation capabilities across every domain simultaneously. In this example, the process is domain agnostic in that the individual chooses the method of transportation based upon external factors which then determine the domain of transportation. Although the pictures appear similar, the simple restaurant analogy no longer applies; rather, a better analogy would be a relay team passing the baton signifying whatever is being moved. Figure 15 endeavors to capture this concept.

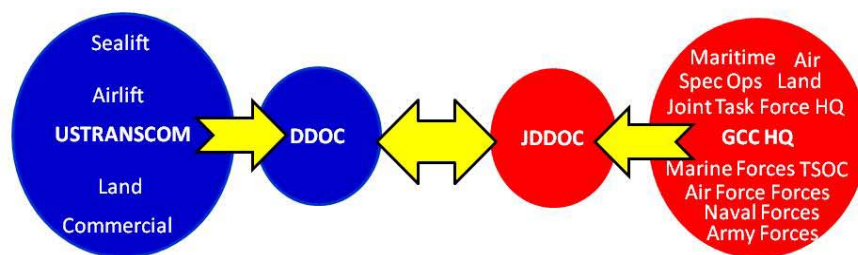


Figure 15: Logistics Cross Domain Communications

USSOCOM offers a third perspective because its communications are organic to the GCC. JP 3-05 unequivocally states:

To fully integrate special operations and conventional operations, SOF must maintain effective liaison with all components of the joint force to ensure that unity of effort is maintained and risk of fratricide is minimized.⁶⁴

Special operations doctrine continues with specific areas where special operations forces must send liaison elements:

Special operations commanders have available specific elements that facilitate C2, coordination, and liaison. They include the special operations command and control element to command and control, and coordinate special operations forces activities with conventional forces; the special operations liaison element (SOLE) to provide liaison to the joint force air component commander or appropriate Service component air C2 facility; and special operations forces liaison officers placed in a variety of locations as necessary to coordinate, synchronize, and deconflict special operations within the operational area. Although not part of a special operations force organization, there is also the special operations coordination element that advises Army corps commanders on special operations. All of these elements significantly improve the flow of information, facilitate concurrent planning, and enhance overall mission accomplishment of the joint force.⁶⁵

It also brings to light the reality that in a resource constrained environment, the most effective method to demonstrate something is important is to allocate resources to attain it. This research will briefly describe the roles and responsibilities of the SOLE in order to demonstrate how a liaison activity can enable different functional components to communicate as well as illustrate the manpower “cost” of the activity.

The SOLE director works directly for the Joint Forces Special Operations Component Commander. The SOLE director is not in the special operations forces chain of command, and thus command authority for mission tasking, planning, and execution of SO remains with the Joint Forces Special Operations Component Commander. The SOLE director places special operations forces ground, maritime, and air liaison personnel in divisions of the joint

air operations center to integrate with the Joint Force Air Component staff. The SOLE accomplishes the coordination, deconfliction, and integration of special operations air, surface, and subsurface operations by providing a special operations forces presence in the joint air operations center that is aware of the activities of special operations forces units in the field and by providing visibility of special operations forces operations in the air tasking order and the airspace control order. The SOLE must also coordinate appropriate fire support coordinating measures to help avoid fratricide. A notional SOLE consists of 43 personnel, but in practice is tailored as appropriate (see Figure 16).⁶⁶

Notional Special Operations Liaison Element Functions

SOLE Director (Liaison to JFACC)

- ☐ **Strategy Division**
 - ☒ Coordinates and synchronizes SO strategy and targets with other components to meet combatant commander objectives and guidance
 - ☒ Nominates SOF targets for inclusion in the Joint Integrated Prioritized Target List
 - ☒ Provides SOF input for JFC apportionment recommendation decisions
- ☐ **Combat Plans Division**
 - ☒ Coordinates SOF air requirements within the Master Air Attack Plan
 - ☒ Coordinates with JSOTF/JSOAC on ATO inputs and ensures distributed ATOs are merged with master ATO
 - ☒ Provides SO input for inclusion in SPINS
 - ☒ Coordinates airspace requirements and deconfliction for future operations
 - ☒ Represents the SO component on the Guidance, Apportionment, Targeting Team
- ☐ **Combat Operations Division**
 - ☒ Monitors and coordinates current day flying operations with other components
 - ☒ Deconflicts ongoing SO surface operations in real time with other components
 - ☒ Maintains updated list of team locations for deconfliction
 - ☒ Coordinates support for and prosecution of SOF-monitored targets to include time-sensitive targets
 - ☒ Coordinates airspace management with JAOC airspace manager
- ☐ **Intelligence, Surveillance, and Reconnaissance Division**
 - ☒ Coordinates ISR requirements for SOF in the field
 - ☒ Provides intelligence support to Combat Plans and Operations Divisions
- ☐ **Other Coordination**
 - ☒ Coordinates requirements for airfield surveys supporting force basing (Air Mobility Division)
 - ☒ Coordinates JTAC support for SOF when required
 - ☒ Coordinates with JSRC
 - ☒ Coordinates logistic requirements including supply, transportation, and contracting (Air Mobility Division)
 - ☒ Coordinates communications requirements, as necessary, for SOF in the field (Communications Representative)

ATO	Air Tasking Order	JSRC	Joint Search and Rescue Center
ISR	Intelligence, Surveillance & Reconnaissance	JTAC	Joint Tactical Air Controller
JAOC	Joint Air Operations Center	SO	Special Operations
JFACC	Joint Force Air Component Commander	SOF	Special Operations Forces
JFC	Joint Force Commander	SOLE	Special Operations Liaison Element
JSOAC	Joint Special Operations Air Component	SPINS	Special Instructions
JSOTF	Joint Special Operations Task Force		

Figure 16: Notional Special Operations Liaison Element Functions⁶⁷

Figure 16 demonstrates the integration of the SOLE elements within the joint air operations center construct. The SOLE effectively integrates and deconflicts special operations activities with the air component. Although tailorable, the 43 member construct assures 24-hour/7-day a week interaction among all joint air operations center staff functions during high operations tempo activities.

Lessons Learned

Communication is critical. All joint planning occurs within the JOP construct articulated in JP 5-0 for that very reason. From the space perspective, it can provide the framework for effective exchange of ideas between two external organizations. It also aids two interdependent organizations to smoothly integrate processes within a single construct thereby minimizing seams that can create shortfalls resulting in the tactical end-user not receiving the support necessary to accomplish the mission. CNO must incorporate itself into the GCC JOP process as operations in a domain of warfare. Treating cyberspace as a domain of warfare is critical to its integration into combat operations; JOP provides a framework for this integration.

A CDR or subordinate JFC creates a functional combatant command to address C2 issues that arise when two or more Services operate in the same domain. It fosters jointness and delineates lines in the road. However, as the cyberspace domain evolves from an external agency towards an interdependent force and arrives as an organic component it is important to keep a strategic view of the end purpose: seamless force presentation at the tactical level of war.

Just as physics teaches that water chooses the path of least resistance when traveling down a hill; operational planners must endeavor to minimize communication barriers created by the additional security requirements associated with special access “need-to-know” programs.⁶⁸

Effectively integrating a non-discussable process into mainstream operations presents significant challenges. Former Air Force Chief of Staff, Gen John P. Jumper stated in 1999:

“I picture myself around that same targeting table where you have the fighter pilot, the bomber pilot, the special operations people and the information warriors. As you go down the target list, each one takes a turn raising his or her hand saying, “I can take that target.”⁶⁹

Achieving this goal via current special access channels can be both cumbersome and time-insensitive. Although obvious, the solution lies in developing better methods to bring CNA operations to the collateral, and eventually the coalition, security levels.^m Although CNO activities do not need to occur at the collateral secret level, operational integration would be greatly facilitated if the discussions of those activities did.ⁿ

Perhaps counter-intuitively, communication becomes more challenging as the cyber capability evolves to an organic process. For example, each component’s space requirements get filtered through a single point, the JFC’s (and GCC commander’s) SCA to reach USSTRATCOM. Likewise, all transportation issues filter through single access points, USTRANSCOM’s DDOC and the GCC’s JDDOC. This in no way trivializes either the space or logistics actions; rather, it centralizes C2 issues in order to ensure mission accomplishment. An organic capability requires cross-domain communication not necessarily for C2 issues; but rather coordination issues such as effects-integration or fratricide prevention. As an example, the joint force air component is but one of several functional components within a joint task force, but the joint force special operations component has developed a 43 member SOLE to effectively ensure

^m This challenge also applies to many other areas in joint operations.

ⁿ One historical example of overcoming this challenge is the F-117. When the F-117 first came out in the late 1980’s, everything about the aircraft was highly classified. However, eventually the aircraft had to operationally integrate within the larger Air Force planning picture. The Air Force was able to successfully integrate the platform and its capability by focusing discussions on what the aircraft did, not how the aircraft did it.

cross-domain communication. Figure 17 endeavors to capture this concept. The manpower required to provide CNO liaisons to all other components can be modeled off of the special operations templates; however, chapter IV will demonstrate that the strawman required for liaison will already be in place.

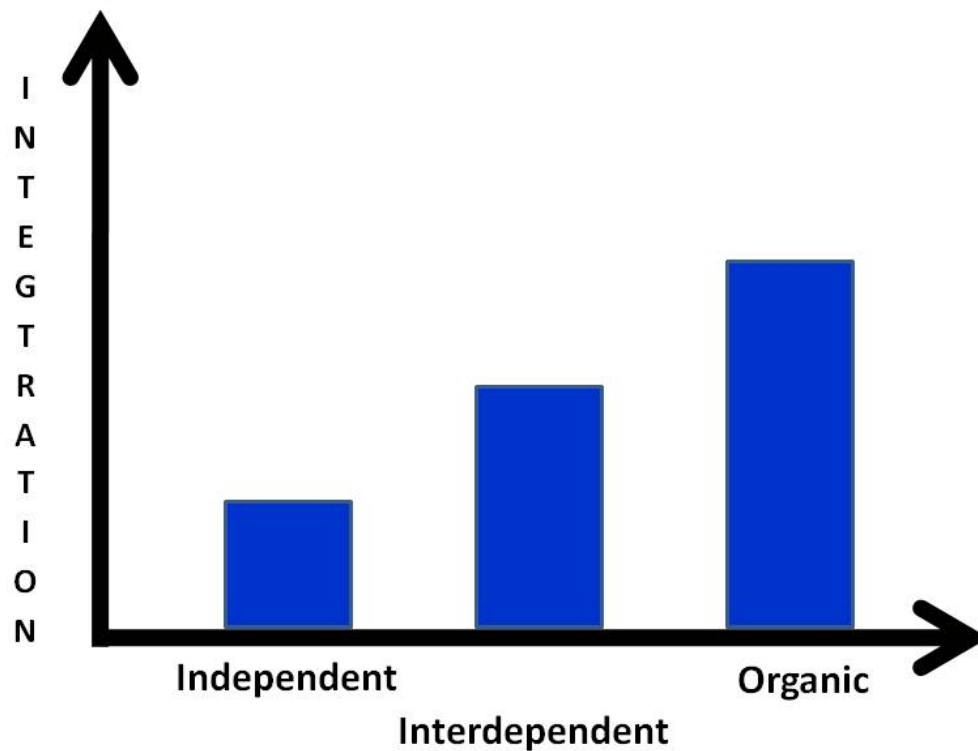


Figure 17: Integration Requirements

This research project used three fundamental questions to determine an ideal CNO force presentation and C2 capability. Having answered the first two, one question remains; how do COCOM's manage Title 10 relationships. The next chapter will address how space, logistics, and special operations relate as Services, COCOMs, and a third organizational construct, combat support agencies.

IV: How Do COCOMs Manage Title 10 Relationships?

Title 10 creates clear lines in the road between three organizations: Services, Combatant Commands, and Combat Support Agencies. JP 1 elaborates:

The Services and USSOCOM (in areas unique to special operations) have responsibilities to organize, train, equip, and sustain forces.⁷⁰

Combatant commands, “(1) deter attacks against the United States, its territories, possessions and bases, and employ appropriate force should deterrence fail; (2) carry out assigned missions and tasks and plan for and executing military operations, as directed, in support of strategic guidance”⁷¹

Combat Support Agencies “prevent unnecessary duplication or overlapping capabilities among the Services by using personnel, intelligence, facilities, equipment, supplies, and services of any or all Services such that military effectiveness and economy of resources will thereby be increased.”⁷²

To determine how best to posture cyber forces to maximize combat capability, the final question this research will address is, “How do Combatant Commands manage Title 10 relationships?” This research will answer this question by addressing the following areas:

- (1) Relationships Between Independent Operations.
- (2) Relationships Between Interdependent Operations.
- (3) Relationships Between Organic Operations

Relationship Between Independent Operations

This research indicates cyber force presentation should adapt lessons learned from space because the SCA model effectively captures the GCC space requirements. This chapter will elaborate on how USSTRATCOM ensures the GCC can effectively enunciate its space requirements. JP 3-14 defines the relationship between USSTRATCOM (in regards to space) and its Service Components. USSTRATCOM directs its Service components to serve as the space proponents within their Services, especially the Service components of GCCs:

[The Service Components] advocate for space requirements within their respective Services, provide a single point of contact for access to Service resources and capabilities, make recommendations to USSTRATCOM on appropriate employment of Service forces, provide assigned space forces to the Commander, USSTRATCOM, and combatant commanders as directed, assist in planning in support of space operations and assigned tasking, and support the Commander, USSTRATCOM, and other combatant commanders with space mission area expertise and advocacy of desired capabilities as requested.⁷³

The space doctrinal template of “farming out” space experts to the GCCs can serve as a model for bridging the gap between an FCC and GCC which operate independently. The FCC, USSTRATCOM, disperses the space expertise resident in its Service components to the Service components resident in the GCC to provide the GCCs “space mission expertise and advocacy.” This approach effectively overcomes one of the greatest challenges of a relationship that is inherently independent.

This research will briefly outline the Service methodologies not only because they can serve as a CNO model, but also because each is slightly tailored to the needs of its Service.

The Army also integrates space capabilities at the army, corps, division, and fires brigade levels using space support elements. Space support elements organic space experts resident in the headquarters staff, are an integral part of the staff and are directly involved in the staff planning process from the beginning. The element is responsible for identifying opportunities to employ space force enhancement, or space control, and then coordinating for the required support. When deployed, the space support element establishes and maintains contact with the SCA. It also coordinates with the SCA on procedures for space support requests and reachback support. The space support element participates in the conduct of mission analysis to determine which space-based capabilities are applicable to the particular operation and then coordinates and makes recommendations for the allocation and use of space services and capabilities.⁷⁴

The Navy methodology is similar to the Army construct but tailored to the naval presentation of combat capability via the naval strike group.

Naval Network Warfare Command Maritime Operations Center provides planners and space reachback for maritime forces and coordinates with other space operations entities, including space operations officers on strike group staffs, on joint force maritime component commander staffs, or maritime headquarters with maritime operations centers responsibilities include:

- (1) Developing space effects packages (naval space plan for maritime forces) and providing space products in support of combat plans to satisfy strike group and forward deployed and theater maritime forces' requirements derived in the planning process.
- (2) Providing space situational awareness for maritime forces.
- (3) Synchronizing with the fleet maritime operations centers to provide operational assessment of maritime operations to facilitate translation of the maritime operator's space needs and ensure delivery of critical space capabilities.⁷⁵

Whereas the Army and Navy integrate the space support elements at the tactical headquarters (HQ) staff (brigade and strike group), the Air Force places its integration capability at the operational HQ.

The director of space forces (DIRSPACEFOR) is a senior Air Force officer with broad space expertise and theater familiarity, normally nominated by Commander Air Force Space Command and approved by the commander, Air Force forces. Air Force Space Command ensures directors of space forces are qualified to perform their responsibilities, and the commander, Air Force forces provides theater-specific information and orientation. The director of space forces facilitates coordination, planning, execution, and assessment of Air Force space operations for the commander of Air Forces to include providing support for joint space operations to the SCA. The commander of Air Force forces can also direct the director of space forces to support the SCA by providing advice on Air Force space forces. When the commander of Air Force Forces serves as the joint force air component commander and is designated the SCA, the director of space forces typically accomplishes the day-to-day duties assigned to the SCA.⁷⁶

Space doctrine regarding Air Force implementation also addresses the possibility the joint force commander will delegate SCA authority to the joint force air component commander,

in which case the air component commander will utilize the director of space forces to provide the expertise to best work with JFCC Space.

Whereas the Army, Air Force, and Navy specifically address where space integration will occur, at either the operational or tactical level, space doctrine regarding Marine Corps space integration merely states that it will happen, not where.

Marine Corps Forces Strategic Command (MARFORSTRAT) also directly supports subordinate functional components and Service component commanders on the proper employment of US Marine Corps forces and capabilities, assists in developing operational and exercise plans, and provides necessary force data to support all assigned missions, including the space mission through the Marine Corps space cadre. MARFORSTRAT provides support to facilitate planning, operations, and exercises for space through established policy and joint employment of assets to Marine Corps forces.⁷⁷

Although USSTRATCOM does not have a TSOC it does maintain a capability to support special operations forces. JP 3-05 identifies USSTRATCOM's ability to provide space "proponents":

USSTRATCOM can provide deployable space support personnel to special operations forces upon request through the supported geographic combatant commander. Space support teams and liaison personnel can assist special operations forces commanders and staff in understanding the capabilities, limitations, and effective application of space systems, and ensure that special operations forces support requirements are clearly understood.⁷⁸

USSTRATCOM's capability to provide space proponents to GCC special operations forces ensures GCC space requirements are identified from every Service or functional component perspective. Figure 18 endeavors to capture this concept.

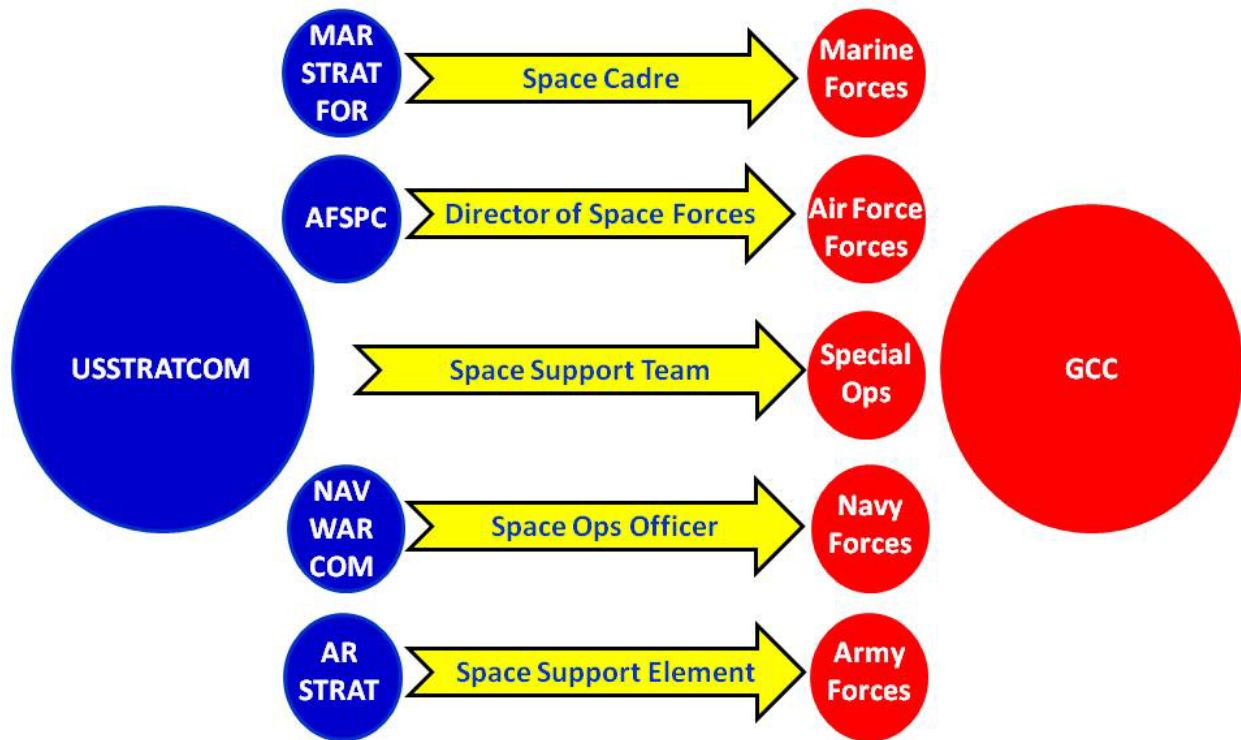


Figure 18: USSTRATCOM Space Proponents

Whereas the previous chapter illustrated the importance of liaison (e.g. the special operations discussion regarding the SOLE) in regards to communication for organic forces, this section highlights the importance of liaison for championing the external agency. The former emphasized communication between equal components within the warfighting force whereas this points toward advocacy and integration of distant capabilities to maximize in-theater warfighter activities. The distinction, while simple, is important because it points to the very purpose of the element and the role it would fulfill in the theater.

Relationships Between Interdependent Operations

The transition to an interdependent force has already begun in the area of running and operating the DoD global information grid. The players include actors from all three Title 10 categories: Services, combatant commands and combat support agencies. For that reason, the

concept of “lines in the road” is very critical to the question of CNO force presentation because building and maintaining networks is inherently a Service responsibility. Joint Publication 1, *Doctrine for the Armed Forces of the United States*, lists common functions of the military Services. It states one function of the Service is,

To develop, garrison, supply, equip, and maintain bases and other installations, including lines of communications, and to provide administrative and logistic support for all forces and bases unless otherwise directed by the Secretary of Defense.⁷⁹

As previously stated however, Joint Publication 1 also clearly states warfighting is the responsibility of the combatant commands.⁸⁰ Joint Publication 6-0, *Joint Communications System*, states USSTRATCOM has been given the mission to operate and defend the global information grid in the Unified Action Plan.⁸¹ USSTRATCOM works with the other combatant commands to ensure their systems operate (NETOPS) and are defended (CND).

The third partner in this equation is a combat support agency, the Defense Information Systems Agency (DISA). DISA is responsible for:

Planning, engineering, acquiring, fielding, and supporting global net-centric solutions to serve the needs of the President, Vice President, the Secretary of Defense, and other DoD Components, under all conditions of peace and war.⁸²

Much of DISA’s role lies in the area of NETOPS, which this research does not address. However, DISA will maintain a role in CNO, specifically, to acquire systems for designed specifically for CNA, CNE, and CND.

USTRANSCOM collaborates with the Services and the Defense Logistics Agency, a combat support agency, to “provide optimal processes for movement of materiel through the distribution pipeline, from sourcing through issuance to end user.”⁸³ In order for this process to operate smoothly, the DoD directed one organization to be in charge. USTRANSCOM was

designated the distribution process owner giving it the authority to oversee the DoD distribution system.⁸⁴ JP 4-0 states:

The Joint Deployment & Distribution Enterprise (JDDE) is that complex of equipment, procedures, doctrine, leaders, technical connectivity, information, shared knowledge, organizations, facilities, training, and materiel necessary to conduct joint distribution operations. USTRANSCOM, as the distribution process owner, will exercise control of the JDDE through coordination and synchronization with the other community of interest partners.⁸⁵

Although simplistic, the concept of a single participant responsible for coordination and synchronization with other community partners is a solid one. Furthermore, it is already utilized by USSTRATCOM via JTF-GNO in its daily operations, especially in regards NETOPS system maintenance issues.^o JP 4-0 enunciates each partners' roles and responsibilities to remove ambiguity and clearly present "lines in the road."

Delineating clear lines in the road also addresses which organization is lead agency in each instance. These lines in the road are not intuitive to navigate and require careful education and training. Of relevance, JP 4-0 clearly states the requirement for career-spanning education in order to develop an effective joint logistician. Figure 19 from JP 4-0 addresses this concept directly.

^o The USSTRATCOM website states on page <http://www.stratcom.mil/factsheets/gno/> (accessed on 4 May, 2009):

The JTF-GNO functions in accordance with Unified Command Plan 2002 (Change 2) and the Joint Concept of Operations for GIG NetOps, assuring Global Information Superiority by achieving the three assurances outlined in the Joint Concept of Operations for GIG NetOps: Assured System and Network Availability, Assured Information Protection, and Assured Information Delivery.

Joint Logisticians Education and Development

One of the most critical considerations for the development, enhancement and control of joint logistics is the process that trains, educates and develops joint and Service logisticians, including military, civilians and contractors. Supporting joint logistic human capital development extends across a broad range of areas from acquisition and industrial processes to logistical support operations. Effective joint logistic management in an ever-changing environment requires a global, systematic and long-term approach to make the most beneficial decisions in support of the joint force and to ensure sustained logistic readiness for the joint force commander (JFC). In addition to developing a Service centric core expertise, logisticians must learn how to think about the complex and dynamic challenges they will face- developing a mature global perspective for prioritization of effort and being comfortable with making decisions in an uncertain operational environment. There is also an experiential component to developing joint logistic skills; some things can only be learned through performance of tasks. Joint logisticians are not expected to possess all the in-depth knowledge necessary to fully support the joint force. However, each is expected to be an expert in their Service or agency's logistic profession, enabling the JFC to integrate diverse logistical support capabilities for the joint force.

Various Sources

Figure 19: Joint Logistics Education⁸⁶

Joint Logisticians create doctrine documents to address specific logistics activities. JP 3-34, *Engineer Operations*, and JP 4-10, *Contractor Management*, illustrate the value of addressing complex areas within unique doctrine documents. Contract support provides an example of a legally complicated action taken by members of the Armed Forces.

Contract support is executed by contracting officers warranted under authorities granted to the Services and other components under Title 10, USC, and in accordance with rules established in the Federal Acquisition Regulation (FAR), the Defense Federal Acquisition Regulation Supplement, and Service FAR supplements. Contract support integration in a large contingency is a complex undertaking for numerous reasons, including separate Service and component contracting authorities, hundreds of contracting activities originating contracts, combatant commands possessing command authority but not contracting authority, contracts originating and largely executed outside the operational area that are activated for performance in the operating area,

separate Service funding sources and Service priorities for support of their own forces.⁸⁷

The example of contracting support also illustrates the importance of proper education and training to prepare members to complete complicated mission requirements within the legal framework. In effect, careful delineation of roles and responsibilities must also be clearly presented to those performing the function through career-long education.

The second critical concept joint logisticians illustrate is the importance of maintaining visibility over distributed operations. JP 4-0 addresses the importance of visibility when discussing contractor operations and supply chain management. It states regarding contractor management:

The combatant commander can easily maintain visibility over contractor personnel working under Service contracts let by contracting officers in the designated operational area. However, his ability to maintain visibility over contractor personnel working under contracts originating outside the designated operational area is more challenging...Contractor management in a large contingency is a complex undertaking that requires close coordination between three elements/entities. These elements are: the CCDR staff involved in planning for the support and setting theater entrance and theater management rules, the Service components that will be involved in providing such support and the contracting officers who will be responsible for ensuring that the contracts properly reflect the respective support relationship between the contractor and the government. Proper planning, coordination, and execution is crucial to maintaining a good military-contractor relationship, maximizing effectiveness, and minimizing costs both the contractor and the government resulting from unplanned support issues.⁸⁸

Logisticians gain visibility over geographically-separated contractors via proper planning, coordination and execution. The three areas listed cover the entire range of operations and reinforce the importance of maintaining visibility in that no area was excluded.

The supply chain offers insight into visibility across the spectrum of participants in the action. JP 4-0 states:

The supply chain process becomes more responsive when activities provide visibility of materiel condition and repair requirements to the supply and distribution providers. Within this process, the services play a key role in optimizing the maintenance function. Visibility enables the most effective delivery of parts to satisfy maintenance requirements. Once repaired, equipment is returned to service for the warfighter, or placed in the supply chain for future distribution.⁸⁹

The concept of visibility conveys such ideas as transparency and awareness. All members must not only know their part of the puzzle but have awareness of other parts and the status of the other parts of the puzzle to truly maximize visibility.

Relationships within Organic Operations

Organic operations are not without challenges. An inherently joint component such as special operations has addressed relationship challenges which are relevant to CNO. Chapter III began with an excerpt from JP-1 which states:

Functional component commands are appropriate when forces from two or more military departments must operate within the same mission area or geographic domain or there is a need to accomplish a distinct aspect of the assigned mission.”⁹⁰

The quotation continued by stating that the joint special operations component was one example, as well as land or air. However, digging a little deeper reveals the requirement for an additional C2 layer brought about by Service interaction.

JP 3-05 defines a Joint Special Operations Task Force:

A joint special operations task force is a joint task force composed of special operations units from more than one Service, formed to carry out a specific special operations or prosecute special operations in support of a theater campaign or other operations. A joint special operations task force may have conventional non-special operations units assigned or attached to support the conduct of specific missions.⁹¹

Figure 20 below illustrates the composition of the joint special operations task force.

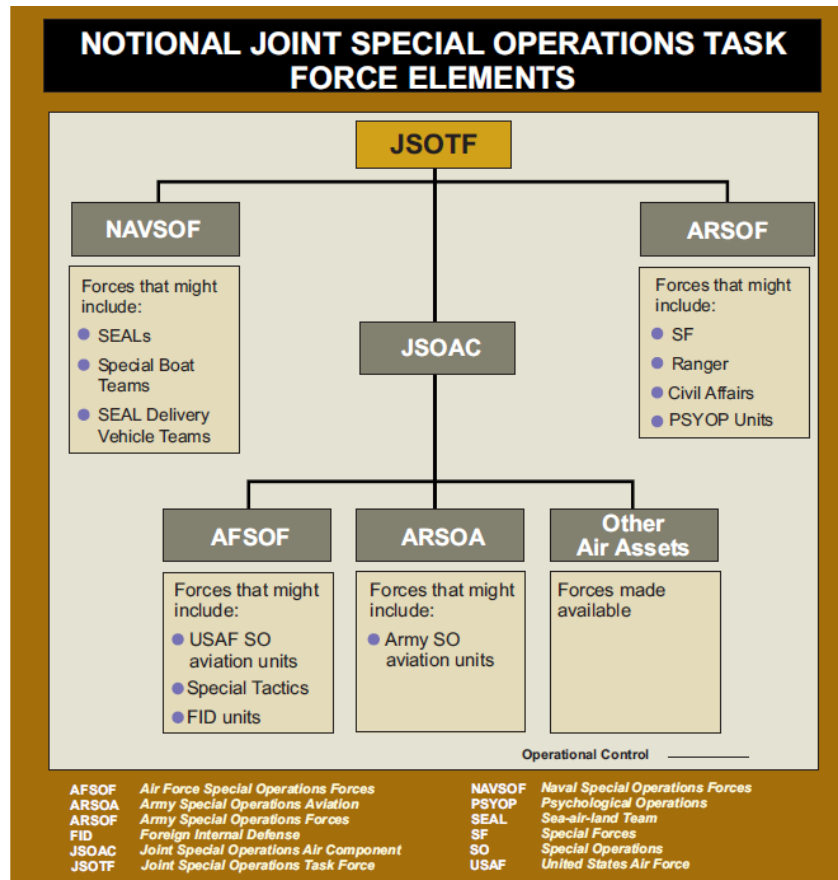


Figure 20: JSOTF Composition⁹²

Figure 20 demonstrates the doctrinal concept of creating a functional component simply because two Services operate in a single domain (air). The significance is the C2 benefit of creating a chain of command addressing Service interaction in the same domain (air). Both the Air Force special operations forces and the Army special operations aviation report to a Joint Special Operations Air Component (JSOAC). JP 3-05 defines the role of the JSOAC as:

The JSOAC Commander is the commander within a joint special operations command responsible for planning and executing joint special operations air activities. This includes the responsibility to coordinate, allocate, task, control, and support the assigned joint special operations aviation assets.⁹³

The JSOAC concept created a layer of oversight with air expertise above the Air Force and the Army elements such that the limited resource (aviation capability) could be distributed in the best manner to support the greatest amount of special operations forces possible.

Lessons Learned

Fighting in cyberspace via CNO at the tactical level is not affected by the operational discussion of force presentation and C2. However, the operational presentation and C2 is critical for integration into the joint fight. USSTRATCOM has developed an effective doctrinal template whereby space “proponents” within the Army and Navy Service components integrate reachback space operations into the tactical scheme of maneuver. The air doctrinal template emphasizes operational, rather than tactical integration and the Marine doctrine is vague (most likely to maximize flexibility). This research maintains cyber forces should adapt the space presentation methodology along current Service doctrinal practices and then deviate as operations then indicate.

USSTRANSCOM’s lessons learned in defining the lines in the road can be of use in transitioning CNO force presentation from independent to organic. The first lesson learned is the requirement for careful delineation of roles and responsibilities. Lines in the road must be both clearly defined and understood by all participants.

Logistics doctrine states the importance of planning, coordination and execution to interdependent operations. This point reveals an inherent drawback of interdependent operations; they are much more complicated than operating independently. Reliance between external agencies not only requires trust, it also requires clear communication. CNO actions occurring at near the speed of light will require extremely detailed planning and coordination because execution communication may in many cases be impossible. For this reason, some may

desire to maintain independent CNO operations rather than advance to interdependent.

However, interdependent is a necessary step when moving to the desired end state of organic operations.

Additional CNO capability will be required in order for CNO forces to evolve from independent to interdependent. The DoD should not centralize the growth in CNO. Rather it should develop a process to create CNO detachments within each COCOM who are born as “SCAs” but grow into a force capable of limited autonomous operations. The STRATCOM “proponents” within the GCC Service components would also evolve into GCC CNO component liaisons.

A sub unified command construct as used in special operations will provide GCCs an organic capability to fight in cyberspace. Furthermore, the USSOCOM role of synchronization would also be extremely relevant to USSTRATCOM in order to ensure a global perspective is still maintained.

CNA, CND, and CNE could become joint functional components within a CNO construct. Figure 21 incorporates the CNO component into the current force presentation doctrinal template. Figure 22 demonstrates the composition of the new sub unified command and CNO joint force functional component.

As an end state, Figures 21 and 22 below illustrate an organic CNO capability within the JTF construct. Of note, the diagrams do not change the doctrinal concept that Services maintain the Title 10 requirement to build, operate, and maintain their own networks (NETOPS); rather, it provides a capability organic to the JTF itself to conduct CNO operations.

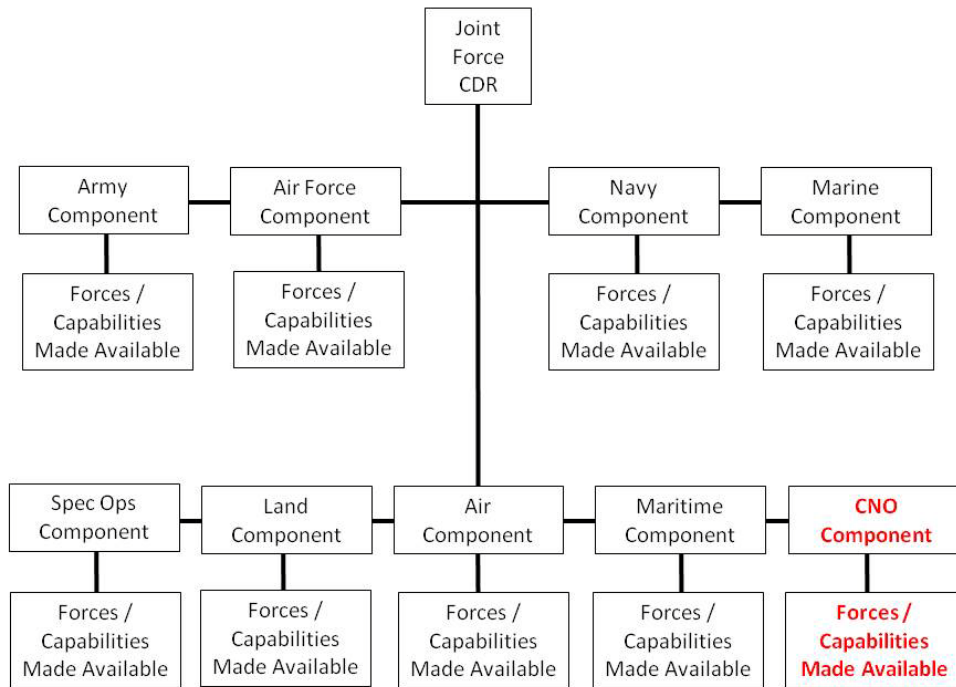


Figure 21: Notional JTF with CNO

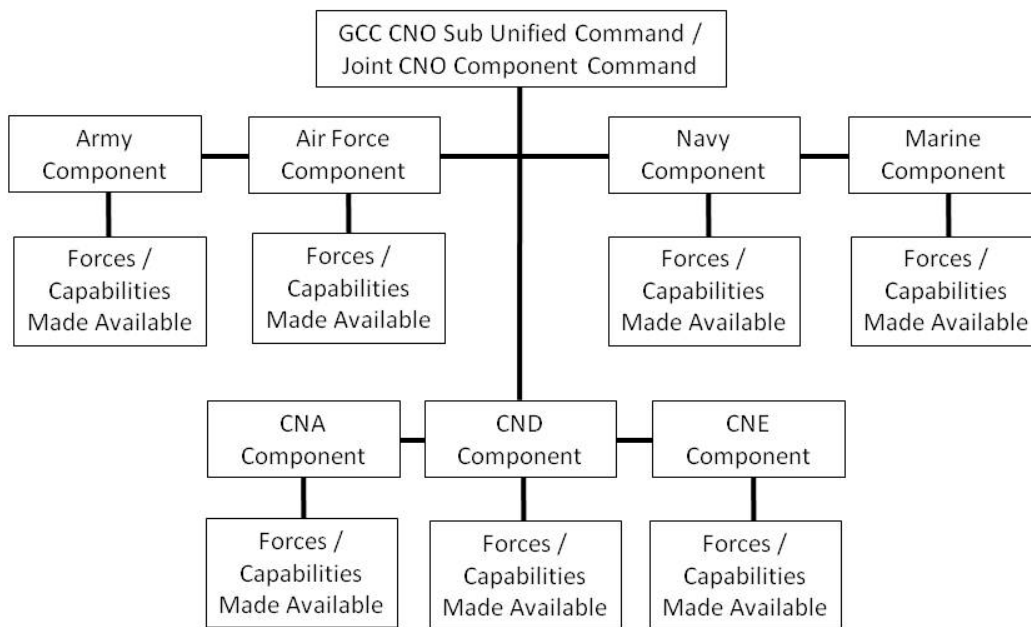


Figure 22: Theater CNO Command/Joint CNO Component

After addressing all three questions, the research can now adapt the lessons learned to create a roadmap which encapsulates all of the lessons learned in its implementation.

V: A Roadmap to Distributed CNO Capability

This chapter will look at how a theater GCC would conduct CNO using the three models identified in this research. It will discuss actions that must be taken to transition CNO operations from independent to organic operations.

Independent Actions: USSTRATCOM provides CNO

Implementing the USSTRATCOM space model involves two areas: adding CNO proponents to each GCC Service component and adapting the concept of SCA. Space doctrine could be used to determine the manpower bill for adding the CNO proponents. Space doctrine provides a template for integrating CNO requirements using the Army's space support elements, the Navy's space operations officers, the Marines' space cadre, the Air Force's director for space forces, and special operations space support teams. Although the solution would likely not be perfect, it would rapidly integrate CNO requirements throughout the GCC joint force.

The GCC would determine whether to maintain the adapted SCA or delegate the responsibility to a functional component. This research will address two possible courses of action (COAs) and their implications. COA 1 will be to utilize the JP 3-13 doctrinal template of the J-39 IO Cell. COA 2 will be to use the JP 3-14 SCA delegation to the Joint Force Air Component Commander.

Should the GCC Commander decide to maintain "SCA" within HQ functional staff, then JP 3-13 provides a doctrinal methodology to address CNO requirements under the J-39 (IO) branch. In COA 1, a USSTRATCOM representative (designated CNO in Joint Publication 3-13) and a J-6 representative (designated information assurance and CND) would use the IO Working Group forum to integrate CNO into theater operations. This model has the limitation that the

CNO person is delegated below the J-39 and is several layers removed from the JFC although this individual is responsible for CNO integration for the entire theater of operations.^p

Following COA 2, the JFC would delegate “SCA” to the Joint Force Air Component Commander using the space template, then to paraphrase Joint Publication 3-14, a senior Air Force officer with broad CNO expertise and theater familiarity would typically accomplish the day-to-day duties assigned to the CNO “SCA” (which would actually be the Joint Force Air Component Commander).^q The advantage of COA 2 lies in its relative prominence of position. It is delegated to a functional component commander (the JFACC) and acted upon by a senior officer with broad CNO experience. This contrasts with being in the JFC staff (a plus) but hidden in the J-39 IO Cell.

Regardless of “SCA” location, each Service liaison would forward its CNO requirements (offensive, defensive, and exploitation) to the “SCA” who would then work with USSTRATCOM to meet the GCC CNO requirements. As with space, arbitration would first occur at the JCS and then would move forward to the SECDEF, if required. USSTRATCOM would complete all CNO activities in a reach back manner and the relationship would be independent in nature. The GCC would maintain and operate all networks but CNO activities would be conducted via USSTRATCOM. CNO actions would originate from USSTRATCOM but the results of the CNA, CND or intelligence gathered via CNE would be shared with the “SCA” in theater.

^p USAF Major Steven R. Luczynski wrote his graduation paper at the Naval War College on his disagreement with the current subordination of CNO within the IO Cell. The paper was titled, “Controlling Information in Cyberspace with a Sound Operational Command Organization”

^q Joint Publication 3-14 on page IV-11 states, “The director of space forces (DIRSPACEFOR) is a senior Air Force officer with broad space expertise and theater familiarity, normally nominated by Commander AFSPC and approved by the commander, Air Force forces (COMAFFOR).”

CND could blur the line with CNA in that a response action could be very offensive in nature. Therefore the GCC Commander should explicitly define CND requirements. As in space activities, the USSTRATCOM “proponents” should be actively involved in determining the CNO requirements.

Interdependent Actions: USSTRATCOM Works With GCC to Provide CNO

The literature review of joint doctrine indicates actions should be taken now to begin the transition to shift CNO from independent operations performed by USSTRATCOM to begin an interdependent relationship with the GCCs. The first action that should occur is to program additional personnel within each GCC to serve as USSTRATCOM CNO detachments with the ability to perform limited CNO activities. These personnel would initially serve as a limited capability detachment but would gain the mission requirement to serve as a cadre for USSTRATCOM augmentation as the process continues to its mature state as a theater organic component.

The CNO “SCA” would grow “JDDOC” like attributes and work with both USSTRATCOM and the theater’s limited CNO capability to provide the GCC with a composite CNO capability. The “SCA” would grow into a Joint CNO Task Force HQ cadre before maturing into a sub unified command. USSTRATCOM would be responsible to augment the theater CNO HQ staff with personnel. Likewise, USSTRATCOM “SCA” activity would grow into a “JDDOC” like activity as it coordinates with CNO “JDDOCs” throughout the GCCs.

As the manpower grows in each GCC, the deployed USSTRATCOM CNO “proponents” in theater would be replaced with organic GCC personnel who would perform the same function but would fall under the COCOM of the theater and OPCON of the Service Component for which they serve as the CNO subject-matter experts. These personnel would maintain the

requirement to filter their CNO requirements to the theater “SCA” (“JDDOC”) who would coordinate with USSTRATCOM to meet the CNO requirements.

Organic Actions: USSTRATCOM Works With Theater CNO Commands

The goal of creating a CNO sub unified command using a special operations forces model is achievable. Proper programming now will enable the buildup of theater CNO forces into theater CNO sub unified commands. Proper planning in the present will enable USSTRATCOM to adapt from an FCC providing independent support activities into a Service-like FCC with a global focus on synchronizing CNO activities throughout the DoD. In the long-term, USSTRATCOM will be able to adopt USSOCOM programming actions using an “MFP-11” programming model to focus on developing joint CNO tools.^r It will also benefit from standing up an education organization similar to the Joint Special Operations University to provide career-spanning education to CNO and selected non-CNO staff officers. The special operations lessons learned outlined in this research can provide a clear path to a theater sub-unified command. Figure 23 illustrates the progression.

^r USSOCOM uses MFP-11 for special operations programming.

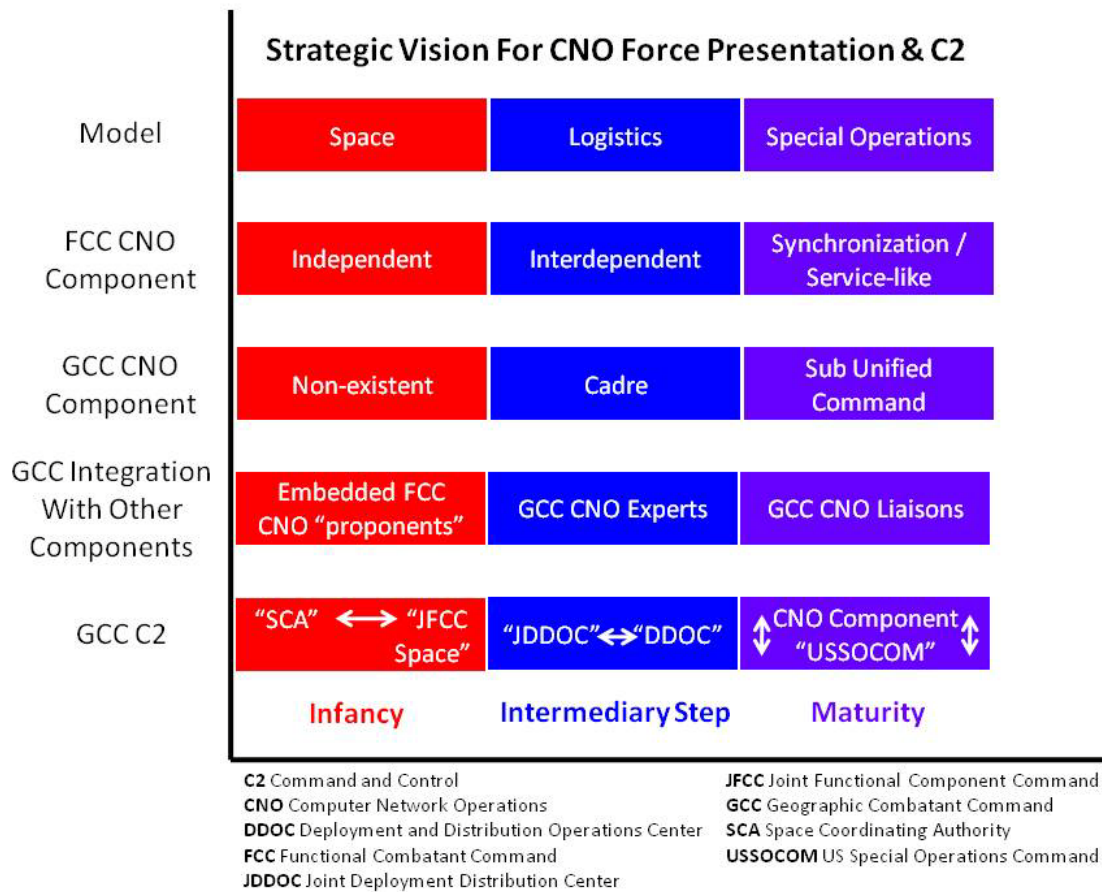


Figure 23: CNO Presentation Model

VI: Conclusions and Recommendations for Further Research

This literature review of joint doctrine indicates USSTRATCOM should consider implementing the following three actions in order to mature CNO force presentation and C2 into an organic force within each GCC. USSTRATCOM should:

- (a) adapt the space SCA and proponent concepts.
- (b) use the logistics force presentation model as an intermediary step towards organic force presentation.
- (c) endorse a strategy of organic CNO force presentation within each GCC.

This study of joint doctrine reveals advantages and disadvantages of independent, interdependent and organic operations. Although space, logistics, and special operations all use distinct interactions between the FCC and GCC, each can be leveraged to present a cohesive roadmap for transforming CNO force presentation into an organic capability within each GCC.

However, this research is merely a roadmap for developing a CNO force presentation and C2 strategy within the DoD. Much more research is required to transform the concepts adapted from this review of joint doctrine into practices to present CNO at the operational level of war. The next step for research development could be to determine the best methodologies to implement the space doctrinal concepts within a CNO construct.

Bibliography

Alberts, David S., John J. Garstka, and Frederick P. Stein. "Network Centric Warfare: Developing and Leveraging Information Superiority (2nd Edition: Revised)." *The Command and Control Research Program*. February 2000. http://www.dodccrp.org/files/Alberts_NCW.pdf (accessed April 15, 2009).

Alexander, Lieutenant General Keith B. "Warfighting in Cyberspace." *Joint Forces Quarterly*. Third Quarter Issue 46, 2007. http://www.ndu.edu/inss/Press/jfq_pages/i46/12.pdf (accessed May 20, 2009).

Chilton, General Kevin J. "Opening Remarks to the April, 2009, US Strategic Command Cyberspace Symposium." *US Strategic Command Speech List*. April 7, 2009. <http://www.stratcom.mil/speeches/23/> (accessed April 20, 2009).

Chilton, Kevin J. "Remarks given at Air Force Association Global Warfare Symposium." *US Strategic Command*. November 21, 2008. <http://www.stratcom.mil/speeches/17/> (accessed May 15, 2009).

Convertino, Sabastian M., Lieutenant Colonel USAF, Lou Anne DeMattei, and Tammy M., Lieutenant Colonel Knierum. "Flying and Figiting Cyberspace." *Air War Collenge Air University Press*. June 2007. www.au.af.mil/au/aul/aupress/Maxwell_Papers/Text/mp40.pdf (accessed May 25, 2009).

Department of Defense. "CJCSI 5120.02A: Joint Doctrine Development." *Joint Electronic Library*. March 31, 2007. http://www.dtic.mil/doctrine/jel/new_pubs/cjcsi5120_02a.pdf (accessed April 20, 2009).

—. "DoD Dictionary of Military Terms." *Joint Electronic Library*. October 17, 2008. http://www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf (accessed April 20, 2009).

Heuer, Richard J. "Psychology of Intelligence Analysis." *Central Intelligence Agency*. 1999. <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/PsychofIntelNew.pdf> (accessed February 1, 2009).

Joint Chiefs of Staff. "Joint Doctrine Hierarchy." *Joint Doctrine Education and Training Electronic Information System*. March 20, 2009. <https://jdeis.js.mil/jel/docinfo/pstatus/status.pdf> (accessed April 01, 2009).

—. "Joint Publication 1, Doctrine for the Armed Forces of the United States." *Joint Electronic Library*. March 20, 2009. http://www.dtic.mil/doctrine/jel/new_pubs/jp1.pdf (accessed April 10, 2009).

—. "Joint Publication 3-05, Joint Special Operations." *Joint Electronic Library*. December 17, 2003. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_05print.pdf (accessed April 10, 2009).

—. "Joint Publication 3-05.1, Joint Special Operations Task Force Operations." *Joint Electronic Library*. April 26, 2007. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_05_1.pdf (accessed April 10, 2009).

—. "Joint Publication 3-13 Information Operations." *Joint Electronic Library*. February 13, 2006. www.dtic.mil/doctrine/jel/new_pubs/jp3_13.pdf (accessed February 1, 2009).

- . "Joint Publication 3-14, Space Operations." *Joint Electronic Library*. Jan 06, 2009. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_14.pdf (accessed April 10, 2009).
- . "Joint Publication 3-17, Joint Doctrine, Tactics, Techniques and Procedures for Air Mobility Operations." *Joint Electronic Library*. April 14, 2006. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_17.pdf (accessed April 10, 2009).
- . "Joint Publication 3-60, Joint Targeting." *Joint Electronic Library*. April 13, 2007. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_60.pdf (accessed April 10, 2009).
- . "Joint Publication 4-0, Joint Logistics." *Joint Electronic Library*. July 18, 2008. http://www.dtic.mil/doctrine/jel/new_pubs/jp4_0.pdf (accessed April 10, 2009).
- . "Joint Publication 5-0, Joint Operational Planning." *Joint Electronic Library*. December 26, 2006. http://www.dtic.mil/doctrine/jel/new_pubs/jp5_0.pdf (accessed April 10, 2009).
- . "Joint Publication 6-0, Joint Communications Systems." *Joint Electronic Library*. March 20, 2006. http://www.dtic.mil/doctrine/jel/new_pubs/jp6_0.pdf (accessed April 10, 2009).
- US Air Force. *Air Force Doctrine Document 2-11, Cyberspace Operations (DRAFT)*. Air University, 2008.
- . "Air Force Doctrine Document 2-5, Information Operations." *Joint Electronic Library*. January 11, 2005. http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_5.pdf (accessed April 10, 2009).

Vita

Major Michael “Bo” Birdwell is the Director of Operations at the Air Mobility Command Air Intelligence Squadron at Scott Air Force Base, Illinois. He just completed the Cyber Warfare Intermediate Developmental Education Program at the Air Force Institute of Technology, Wright Patterson Air Force Base Ohio. He has spent nine of his thirteen years on active duty directly supporting flying operations at the wing level. Maj Birdwell previously completed a tour as the 35th Operations Support Squadron Intelligence Flight Commander where he led the Pacific Air Force’s 2007 Operations Support Squadron/ Information Operations Flight of the Year. He previously served as one of the cadre members of the 11th Intelligence Squadron where he helped stand up Air Force Special Operations Command’s Full Motion Video intelligence analysis capability. Major Birdwell also previously served at the 347th Rescue Wing where he developed rescue intelligence tactics, techniques, and procedures for all active, reserve, and guard rescue forces.

Endnotes

-
- ¹ DoD Dictionary of Military Terms. “Joint Doctrine.” Available for download at <http://www.dtic.mil/doctrine/jel/doddict/data/j/5003.html> and accessed on 20 April, 2009.
- ² CJCSI 5120.02A, 31 March, 2007. p. A-2. Available for download from http://www.dtic.mil/cjcs_directives/cjcs/instructions.htm#5000 and accessed on 20 April, 2009.
- ³ General Kevin Chilton, Opening Remarks to the April, 2009, USSTRATCOM Cyberspace Symposium. Remarks available for download at <http://www.stratcom.mil/speeches/23/> and accessed on 20 April, 2009.
- ⁴ Alexander, Lieutenant General Keith B. “Warfighting in Cyberspace,” in Issue 46 (Quarter 3) 2007, p. 60. Available online at http://www.ndu.edu/inss/Press/jfq_pages/i46/12.pdf and accessed on 20 May, 2009.
- ⁵ Joint Publication (JP) 6-0, *Joint Communications System*, 20 Mar, 2006, p. IV-1. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp6_0.pdf) and downloaded 10 April, 2009.
- ⁶ JP 6-0, p. IV-1.
- ⁷ Alexander. “Warfighting in Cyberspace,” p. 59.
- ⁸ The current listing of Joint Doctrine hierarchy can be accessed from the JDEIS website at <https://jdeis.js.mil/jdeis/jel/docinfo/pstatus/status.pdf> and was downloaded on 1 April, 2009.
- ⁹ JP 3-13, *Information Operations*, 13 Feb, 2006, p. IV-4, 5. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_13.pdf) and downloaded 1 February, 2009.
- ¹⁰ Lieutenant Colonel Sebastian M. Convertino II, Lou Anne DeMattei, and Lieutenant Colonel Tammy M. Knierim, *Flying and Fighting in Cyberspace*, Air University Press, Maxwell Air Force Base, Alabama, June 2007, p. 5. Available online at www.au.af.mil/au/aul/aupress/Maxwell_Papers/Text/mp40.pdf and downloaded on 25 May, 2009.
- ¹¹ Richard J. Heuer, *Psychology of Intelligence Analysis*, Center for the study of Intelligence, Central Intelligence Agency, 1999, pp. 32 and 34. This document is available online for viewing at <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/PsychofIntelNew.pdf> and was downloaded on 1 Feb, 2009.
- ¹² DoD Dictionary of Military Terms. “Joint Doctrine.” Available for download at <http://www.dtic.mil/doctrine/jel/doddict/data/j/5003.html> and accessed on 20 April, 2009.
- ¹³ Chilton, Cyberspace Symposium Opening Remarks.
- ¹⁴ JP 4-0, *Joint Logistics*, 18 Jul, 2008, p. iiv. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp4_0.pdf) and downloaded 10 April, 2009.
- ¹⁵ JP 1, *Doctrine for the Armed Forces of the United States*, 02 May, 2007, incorporating change 1 dated 23 March, 2009, p. IV-3. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp1.pdf) and downloaded 10 April, 2009.
- ¹⁶ JP 1, p. IV-12.
- ¹⁷ JP 1, p. IV-11.
- ¹⁸ JP 3-14, *Space Operations*, 06 Jan 2009, p. I-8. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_14.pdf) and downloaded 10 April, 2009.
- ¹⁹ JP 3-14, I-2.
- ²⁰ JP 3-14, I-7.

-
- ²¹ JP 3-17, *Joint Doctrine and Tactics, Techniques, and Procedures for Air Mobility Operations*. 14 Aug, 2002, incorporating change 1 dated 14 Apr, 2006, p. I-3. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_17.pdf) and downloaded 10 April, 2009.
- ²² JP 3-05, *Doctrine for Joint Special Operations*, 17 December 2003. p. viii. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_05.pdf) and downloaded 10 April, 2009.
- ²³ JP 3-05, III-2
- ²⁴ The USSOCOM mission statement is available online at http://www.socom.mil/Docs/Command_Mission_26112007.pdf and was accessed on 14 May, 2009.
- ²⁵ JP 3-14, III-1.
- ²⁶ JP 3-14, IV-5.
- ²⁷ JP 3-14, V-11.
- ²⁸ JP 3-14, V-11.
- ²⁹ JP 3-14, V-2.
- ³⁰ JP 3-14, I-7.
- ³¹ JP 3-14, V-2
- ³² JP 3-14, V-2.
- ³³ JP 4-0, III-8.
- ³⁴ JP 4-0, III-8.
- ³⁵ JP 4-0, III-7.
- ³⁶ JP 4-0, III-7.
- ³⁷ JP 4-0, V-5,6
- ³⁸ JP 3-05, III-2
- ³⁹ JP 3-05, p. A-1
- ⁴⁰ The C-130 image is available on the internet at <http://924tfg.com/Photos/c130-3.jpg> and the AC-130U image is available on the internet at <http://www.globalsecurity.org/military/systems/aircraft/images/ac-130u-19990803ac130a.jpg> Both images were accessed on 18 May, 2009.
- ⁴¹ JP 3-14, III-2.
- ⁴² JP 3-14, III-2.
- ⁴³ JP 3-14, III-2.
- ⁴⁴ JP 3-14, III-2.
- ⁴⁵ JP 3-14, V-1
- ⁴⁶ JP 4-0, V-5,6
- ⁴⁷ JP 1, p. III-12.
- ⁴⁸ JP 3-05, p. III-4.
- ⁴⁹ JP 3-05, p. III-3.
- ⁵⁰ JP 3-05, p. III-2.
- ⁵¹ General Kevin Chilton, Remarks to the November, 2008, Air Force Association Global Warfare Symposium. Remarks available for download at <http://www.stratcom.mil/speeches/17/> and accessed on 15 May, 2009.
- ⁵² JP 1, III-13.
- ⁵³ Chilton, Global Warfare Symposium remarks.

-
- ⁵⁴ USSOCOM mission statement available online at http://www.socom.mil/Docs/Command_Mission_26112007.pdf and accessed on 14 May, 2009.
- ⁵⁵ Chilton, Cyberspace Symposium Opening Remarks.
- ⁵⁶ JP 1, p. V-4.
- ⁵⁷ JP 3-60, Joint Targeting, 13 Apr, 2007, p. I-8. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_60.pdf) and downloaded 10 April, 2009.
- ⁵⁸ JP 4-0, p. viii.
- ⁵⁹ JP 5-0, *Joint Operational Planning*, 26 December, 2006, p. i. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp5_0.pdf) and downloaded 10 April, 2009.
- ⁶⁰ JP 3-14, p. V-3.
- ⁶¹ JP 4-0, p. III-6.
- ⁶² JP 3-05.1, *Joint Special Operations Task Force Operations*, 26 Apr 2007, p. IV-5. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/new_pubs/jp3_05_1.pdf) and downloaded 10 April, 2009.
- ⁶³ JP 3-05.1, p. II-18.
- ⁶⁴ JP 3-05, p. viii.
- ⁶⁵ JP 3-05, III-10.
- ⁶⁶ JP 3-05, III-11.
- ⁶⁷ JP 3-05, III-12.
- ⁶⁸ AFDD 2-11 Cyberspace Operations 15 July 2008 (*Draft*) p. 42.
- ⁶⁹ Air Force Doctrine Document 2-5, *Information Operations*, 11 Jan, 2005, p. 19. Available for access at the Joint Electronic Library (http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_5.pdf) and downloaded 10 April, 2009.
- ⁷⁰ JP 1, p. ii.
- ⁷¹ JP 1, p. III-13.
- ⁷² JP 1, p. III-2.
- ⁷³ JP 3-14, IV-7, 8.
- ⁷⁴ JP 3-14, p. IV-8.
- ⁷⁵ JP 3-14, IV-9, 10.
- ⁷⁶ JP 3-14, p. IV-11.
- ⁷⁷ JP 3-14, p. IV-9.
- ⁷⁸ JP 3-05, p. IV -7.
- ⁷⁹ JP 1, p. III-11.
- ⁸⁰ JP 1, p. III-12.
- ⁸¹ JP 6-0, p. xiii.
- ⁸² The quote is taken from the DISA mission statement posted on the DISA website at <http://www.disa.mil/about/ourwork.html> and accessed on 04 May, 2009.
- ⁸³ JP 4-0, p. xiii.
- ⁸⁴ JP 4-0, p. II-7.
- ⁸⁵ JP 4-0, p. xiii
- ⁸⁶ JP 4-0, p. I-3.
- ⁸⁷ JP 4-0, II-16.
- ⁸⁸ JP 4-0, p. II-17.
- ⁸⁹ JP 4-0, p. II-6.

-
- ⁹⁰ JP 1, p. V-4.
⁹¹ JP 3-05, III-6.
⁹² JP 3-05, III-7.
⁹³ JP 3-05, III-9.

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 074-0188	
The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to an penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 18-06-09		2. REPORT TYPE Graduate Research Project		3. DATES COVERED (From – To) 15 May 2008 – 18 June 2009	
4. TITLE AND SUBTITLE If You Don't Know Where You Are Going, You Probably Will End Up Somewhere Else. Computer Network Operations Force Presentation				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Michael B. Birdwell, Major, USAF				5d. PROJECT NUMBER ENS 09-153	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S) Air Force Institute of Technology Graduate School of Engineering 2950 Hobson Way Wright Patterson Air Force Base, Ohio, 45433-7765				8. PERFORMING ORGANIZATION REPORT NUMBER AFIT/ICW/ENG/09-02	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Major William F. Dobbs (DSN: 425-8586, NIPR e-mail: william.dobbs@pentagon.af.mil) Headquarters, United States Air Force, Office of the Vice Chief of Staff, Quadrennial Defense Review Office 1670 Air Force Pentagon Washington, DC 20330				10. SPONSOR/MONITOR'S ACRONYM(S): HAF/CVAQ	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S):	
12. DISTRIBUTION/AVAILABILITY STATEMENT Unclassified//Cleared for Public Release					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <p>The purpose of this research was to determine if computer network operations force presentation determination could benefit from studying examples from how functional combatant commands presented other forces and capabilities to the geographic combatant commands. Specifically, this study researched how the US Strategic Command presented space capabilities, how US Transportation Command presented logistics capabilities and how US Special Operations Command presented special operations forces. The research objective was achieved through a literature review of joint doctrine. The key topics examined in the literature review include: how do functional combatant commands interrelate with geographic combatant commands, how do combatant commands command and control cross-domain dependencies, and how do combatant commands manage cross-title relationships. The survey first looked for overarching lessons learned but determined each example (space, logistics, and special operations) necessarily used different force presentation models based upon resource allocation.</p> <p>This literature review of joint doctrine indicates US Strategic Command should consider implementing the following three actions in order to enact a strategy of developing organic CNO forces within each GCC. US Strategic Command should:</p> <p>(a) adapt the space SCA and proponent concepts.</p> <p>(b) use the logistics force presentation model as an intermediary step towards organic force presentation.</p> <p>(c) endorse a strategy of organic CNO force presentation within each GCC.</p>					
15. SUBJECT TERMS Computer Network Operations, Force Presentation, Command and Control, Joint Doctrine, Cyberspace					
16. SECURITY CLASSIFICATION OF: Unclassified/Releasable to Public			17. LIMITATION OF ABSTRACT UU		19a. NAME OF RESPONSIBLE PERSON Robert F. Mills, PhD (ENG)
REPORT U	ABSTRACT U	c. THIS PAGE U	18. NUMBER OF PAGES 73		19b. TELEPHONE NUMBER (Include area code)(937) 257-3636x4527 robert.mills@afit.edu